SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Deemed to be University u/s 3 of UGC Act, 1956)

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMMES

Bachelor of Computer Applications (Honors)

(III to VIII Semester)

(National Education Policy/National Credit Framework)

Learning Outcome-Based Curriculum Framework

Regulations 2024

Faculty of Science and Humanities

Office of the Registrar, SRM IST

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Approved in:

69th Executive Council Meeting 28.12.2024

57th Academic Council Meeting 30.11.2024

SURUTTAIA UDAIYAR PONNUSAMY

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REGISTRAR

FACULTY OF SCIENCE AND HUMANITIES

ACADEMIC CURRICULA

UNDERGRADUATE DEGREE PROGRAMME

Bachelor of Computer Applications (Honors)

Four Years

National **E**ducation **P**olicy

Learning **O**utcome-based **C**urricula **F**ramework

National **C**redit **F**ramework

Academic Year

2024 - 2025



SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Deemed to be University u/s 3 of UGC Act, 1956)

Kattankulathur, Chengalpattu District 603203, Tamil Nadu, India

1.	Vision Statement
Stmt - 1	Imparting quality education in Computer Applications and prepare young minds to serve community
Stmt - 2	Contributing effectively to produce globally competent quality professionals in the field of Computer Applications
Stmt -3	Prioritizing adaptability and industry alignment for a unique learning experience

2.	Mission Statement
Stmt - 1	Impart student's essential knowledge and skills required for a successful career in Computer Applications
Stmt - 2	Cultivate and foster a conducive environment for scholarly research
Stmt - 3	Inculcate in the students a sense of commitment to professional ethics, moral values with emphasis on team work and leadership qualities
Stmt - 4	Instill the students with a clear awareness of environmental issues and their relevance to their profession
Stmt - 5	Impress upon the students the impact of their work on the nation's economic and social progress

"Stmt" stands for Statement

3.	Programme Education Objectives (PEO)
PEO - 1	To develop skills and domain knowledge to solve real world problems in diverse applications
PEO - 2	To facilitate professional skills and competencies for successful career in the field of Computer applications
PEO - 3	To possess the knowledge for pursuing advanced studies and entrepreneurial opportunities in the field of Computer Applications
PEO - 4	To kindle the minds of students to take up research and development in Computer Applications with missionary zeal
PEO - 5	To prepare the students as balanced individuals who are keen to leave a mark by excelling in their profession

4.	Consistency of Programme Education Objectives with Mission				
	Mission Stmt. - 1	Mission Stmt. - 2	Mission Stmt. – 3	Mission Stmt. - 4	Mission Stmt. - 5
PEO - 1	High	High	High	High	Medium
PEO - 2	High	High	Medium	High	High
PEO - 3	High	Medium	Medium	Medium	Low
PEO - 4	Medium	Low	High	Low	Medium
PEO - 5	High	High	Low	Medium	High

** H – High Correlation, M – Medium Correlation, L – Low Correlation
** H, M, and L have numerical equivalents of 3, 2, 1 correspondingly

5.	Programme Learning Outcomes (PLO)
	Graduate Learning Attributes
PLO - 1	Problem Solving, Critical Thinking, Creativity
PLO - 2	Communication Skills, Collaborating Skills
PLO - 3	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills
PLO - 4	Leadership Qualities, Professionalism, Autonomy, Accountability
PLO - 5	Digital Technology Skills
PLO – 6	Value Inculcation, Multicultural inclusivity
PLO – 7	Environmental Action, Community Engagement
PLO – 8	Entrepreneurial Risk Taking
PSO -1	Encompassing both theoretical knowledge and real-world applications to solve problems, to evaluate information and to develop software tools
PSO-2	Practical, analytical, proficient programming skills and inovative solutions in various domains of Computer Applications

PSO-Programme Specific Outcome

6. Mapping of PLOs with PEOs										
	PLO - 1	PLO - 2	PLO - 3	PLO - 4	PLO - 5	PLO - 6	PLO - 7	PLO – 8	PSO - 1	PSO - 2
PEO - 1	3	3	3	2	3	1	1	3	3	3
PEO - 2	3	3	3	3	3	2	3	2	3	3
PEO - 3	2	2	2	1	2	2	2	3	3	3
PEO - 4	3	2	3	2	3	3	3	2	3	3
PEO - 5	2	3	2	3	2	3	2	2	2	3

7. Programme Structure

Discipline Core Courses (C)

Course Code	Course Title	Sessions/ Week			C
		L	T	P	
UCA24101J	Digital Logic Design	3	0	3	4
USA24102J	Programming for Problem Solving	3	0	3	4
UMS24101T	Discrete Mathematical Structures	4	0	0	4
USA24201J	Data Structures and Algorithms	3	0	3	4
UCA24202J	Object Oriented Programming	3	0	3	4
UMS24202T	Mathematical Foundation	4	0	0	4
UCA24301J	Programming using Java	3	0	3	4
USA24302J	Database Management System	3	0	3	4
UMS24303T	Statistical Methods	4	0	0	4
USA24401J	Python Programming	3	0	3	4
Total Learning Credits					40

Discipline Core Elective Courses (D)

Course Code	Course Title	Sessions/ Week			C
		L	T	P	
UMS24D01T	Resource Management Techniques	4	0	0	4
UMS24D02T	Numerical Methods				
UCA24D03J	Computer Networks	3	0	3	4
UCA24D04J	Windows Programming				
UCA24D05J	Open Source Technologies	3	0	2	4
UCA24D06J	Operating Systems				
USA24D07J	Cloud Computing	3	0	3	4
UCA24D08J	Web Development using AngularJS and MongoDB				
UCA24D09T	Software Engineering and Testing	4	0	0	4
USA24D10T	Wireless Communication and Mobile Computing				
UCA24D11T	Research Methodology in Computer Applications	4	0	0	4
UDS24D12T	Data Analytics for Project Management				
UCA24D13J	Programming using C#	3	0	3	4
UCA24D14J	Internet of Things				
UCA24D15J	Object Oriented Analysis and Design	3	0	3	4
UCA24D16J	Computer Vision				
UCA24D17J	Web Development using Node JS and MongoDB	3	0	2	4
USA24D18J	Cyber Security				
UCA24D19J	Big Data Analytics	3	0	2	4
USA24D20J	Blockchain Technology				
Total Learning Credits					40

Elective Courses (Minor) (E)

Course Code	Course Title	Sessions/ Week			C
		L	T	P	
UDS24E01J	Data Science and Analytics	3	0	3	4
UDS24E02J	Data Analytics using Spreadsheet	3	0	3	4
UDS24E03J	Essentials of Machine Learning	3	0	3	4
UDS24E04J	Programming using R	3	0	3	4
UDS24E05J	Programming using Python	3	0	3	4
UDS24E06J	Introduction to Deep Learning	3	0	3	4
UDS24E07J	Applications of Computer Vision	3	0	3	4
UDS24E08J	Data Visualization Tools	3	0	3	4
Total Learning Credits					32

Multidisciplinary Courses (M)

Course Code	Course Title	Sessions / Week			C
		L	T	P	
UCA24M01J	Web Technology	2	0	2	3
UCA24M02J	Go Programming	2	0	3	3
UCA24M03J	Data Analysis using R	2	0	3	3
Total Learning Credits					9

Value Added Courses (V)

Course Code	Course Title	Sessions / Week			C
		L	T	P	
UCD24V01T	Essentials of Artificial Intelligence	1	0	0	1
UES24V01T	Environmental Studies	2	0	0	2
UCD24V02T	Universal Human Values	2	0	0	2
Total Learning Credits					5

Ability Enhancement Courses(A)					
Course Code	Course Title	Sessions / Week			C
		L	T	P	
ULT24AE1J	Tamil - I	2	0	2	3
ULH24AE1J	Hindi - I				
ULF24AE1J	French - I				
ULE24AE1J	English	2	0	2	3
ULT24AE2J	Tamil - II	2	0	2	3
ULH24AE2J	Hindi - II				
ULF24AE2J	French - II				
Total Learning Credits					9

Skill Enhancement Courses (S)					
Course Code	Course Title	Sessions/ Week			C
		L	T	P	
UCD24S01J	Verbal Ability and Skill Development	1	0	2	2
UCD24S02L	Quantitative Aptitude and Logical Reasoning	0	0	2	1
UCD24S03J	Industry Oriented Employability and Leadership Skills	1	0	2	2
UEN24S01L	Communication Skills	0	0	4	2
UCD24S04J	Career Readiness and Professional Skills	1	0	2	2
Total Learning Credits					9

Project Work / Internship (P)					
Course Code	Course Title	Sessions/ Week			C
		L	T	P	
UCA24P01L	Internship – I	0	0	0	1
UCA24P02L	Internship – II	0	0	0	1
UCA24P03L	Project Work	0	0	4	2
UCA24P04L	Research Project and Dissertation	0	0	24	12
UCA24P05L	Professional Internship				
Total Learning Credits					16

Mandatory Courses (Y)					
Course Code	Course Title	Sessions/ Week			C
		L	T	P	
UNS24Y01L	NSS	0	0	0	0
UNC24Y01L	NCC				
UNO24Y01L	NSO				
UYG24Y01L	YOGA				
UMI24Y01L	My India Project	0	0	0	0
Total Learning Credits					0

Internship – 1 to be completed during Summer Vacation of the First year
Internship – 2 to be completed during Summer Vacation of the Second year
Students from other departments can enroll in Elective Courses (Minor) (E)
Students from all departments will be able to enroll in Multidisciplinary Courses (M).

8. Course Allocation Across Semesters

Semester – I					
Course Code	Course Title	Sessions Per Week			C
		L	T	P	
ULT24AE1J	Tamil – I	2	0	2	3
ULH24AE1J	Hindi – I				
ULF24AE1J	French – I				
ULE24AE1J	English	2	0	2	3
UCA24101J	Digital Logic Design	3	0	3	4
USA24102J	Programming for Problem Solving	3	0	3	4
UMS24101T	Discrete Mathematical Structures	4	0	0	4
UCD24S01J	Verbal Ability and Skill Development	1	0	2	2
Total Learning Credits					**20**

Semester – II					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
ULT24AE2J	Tamil – II	2	0	2	3
ULH24AE2J	Hindi – II				
ULF24AE2J	French – II				
USA24201J	Data Structures and Algorithms	3	0	3	4
UCA24202J	Object Oriented Programming	3	0	3	4
UMS24202T	Mathematical Foundation	4	0	0	4
UCD24V01T	Essentials of Artificial Intelligence	1	0	0	1
	Multidisciplinary Course – I				3
UCD24S02L	Quantitative Aptitude and Logical Reasoning	0	0	2	1
UNS24Y01L	NSS	0	0	0	0
UNC24Y01L	NCC				
UNO24Y01L	NSO				
UYG24Y01L	YOGA				
Total Learning Credits					20

Total Learning Credits of Courses of FIRST year = 40

Semester – III					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
UCA24301J	Programming using Java	3	0	3	4
USA24302J	Database Management System	3	0	3	4
UMS24303T	Statistical Methods	4	0	0	4
	Minor Elective – I				4
	Multidisciplinary Course – II				3
UCA24P01L	Internship -I	0	0	0	1
Total Learning Credits					20

Semester – IV					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
USA24401J	Python Programming	3	0	3	4
UMS24D01T	Resource Management Techniques	4	0	0	4
UMS24D02T	Numerical Methods				
	Minor Elective – II				4
	Minor Elective – III				4
UEN24S01L	Communication Skills	0	0	4	2
UCD24S03J	Industry Oriented Employability and Leadership Skills	1	0	2	2
UMI24Y01L	My India Project	0	0	0	0
Total Learning Credits					**20**

Total Learning Credits of Courses of SECOND year = 40

Semester – V					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
UCA24D03J	Computer Networks	3	0	3	4
UCA24D04J	Windows Programming				
UCA24D05J	Open Source Technologies	3	0	2	4
UCA24D06J	Operating Systems				
	Minor Elective – IV				4
	Multidisciplinary Course – III				3
UES24V01T	Environmental Studies	2	0	0	2
UCD24S04J	Career Readiness and Professional Skills	1	0	2	2
UCA24P02L	Internship - II	0	0	0	1
Total Learning Credits					**20**

Semester – VI					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
USA24D07J	Cloud Computing	3	0	3	4
UCA24D08J	Web Development using AngularJS and MongoDB				
UCA24D09T	Software Engineering and Testing	4	0	0	4
USA24D10T	Wireless Communication and Mobile Computing				
	Minor Elective – V				4
	Minor Elective – VI				4
UCA24P03L	Project Work	0	0	4	2
UCD24V02T	Universal Human Values	2	0	0	2
Total Learning Credits					**20**

Total Learning Credits of Courses of THIRD year = 40

Semester – VII					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
UCA24D11T	Research Methodology in Computer Applications	4	0	0	4
UDS24D12T	Data Analytics for Project Management				
UCA24D13J	Programming using C#	3	0	3	4
UCA24D14J	Internet of Things				
UCA24D15J	Object Oriented Analysis and Design	3	0	3	4
UCA24D16J	Computer Vision				
	Minor Elective – VII				4
	Minor Elective – VIII				4
Total Learning Credits					**20**

Semester – VIII					
Course Code	**Course Title**	**Sessions Per Week**			**C**
		L	**T**	**P**	
UCA24D17J	Web Development using Node JS and MongoDB	3	0	2	4
USA24D18J	Cyber Security				
UCA24D19J	Big Data Analytics	3	0	2	4
USA24D20J	Blockchain Technology				
UCA24P04L	Research Project and Dissertation	0	0	24	12
UCA24P05L	Professional Internship				
Total Learning Credits					**20**

Total Learning Credits of Courses of FOURTH year = 40

8.1 Elective Courses (MINOR) offered by the Department of Computer Applications to other Departments (excluding Department of Computer Applications)

Elective Courses (Minor) (E)						
Semester	**Course Code**	**Course Title**	**Hours/ Week**			
			L	**T**	**P**	**C**
III	UDS24E01J	Data Science and Analytics	3	0	3	4
IV	UDS24E02J	Data Analytics using Spreadsheet	3	0	3	4
IV	UDS24E03J	Essentials of Machine Learning	3	0	3	4
V	UDS24E04J	Programming using R	3	0	3	4
VI	UDS24E05J	Programming Using Python	3	0	3	4
VI	UDS24E06J	Introduction to Deep Learning	3	0	3	4
VII	UDS24E07J	Applications of Computer Vision	3	0	3	4
VII	UDS24E08J	Data Visualization Tools	3	0	3	4
Total Learning Credits						**32**

8.2 Multidisciplinary Courses offered by the Department of Computer Applications to all departments (including Department of Computer Applications)

Multidisciplinary Courses (M)						
Semester	**Course Code**	**Course Title**	**Hours/ Week**			
			L	**T**	**P**	**C**
II	UCA24M01J	Web Technology	2	0	2	3
III	UCA24M02J	Go Programming	2	0	3	3
V	UCA24M03J	Data Analysis using R	2	0	3	3
Total Learning Credits						**9**

9. Programme Articulation Matrix

Course Code	Course Title	Programme Learning Outcomes (PLO)									
		1	2	3	4	5	6	7	8	PSO1	PSO2
ULT24AE1J	Tamil – I	2	1	1	1	-	1	1	1	-	-
ULH24AE1J	Hindi – I	2	2	1	2	2	1	1	-	-	-
ULF24AE1J	French – I	2	2	1	2	2	1	1	-	-	-
ULE24AE1J	English	-	3	3	3	2	1	-	2	-	-
UCA24101J	Digital Logic Design	3	2	2	2	3	3	-	2	2	2
USA24102J	Programming for Problem Solving	3	2	2	2	3	3	-	2	2	2
UMS24101T	Discrete Mathematical Structures	3	2	2	2	3	3	-	2	2	2
UCD24S01J	Verbal Ability and Skill Development	3	3	2	2	-	3	-	2	2	2
ULT24AE2J	Tamil – II	2	1	2	1	-	1	1	1	-	-
ULH24AE2J	Hindi – II	2	2	1	2	2	1	1	-	-	-
ULF24AE2J	French – II	2	2	1	2	2	1	1	-	-	-
USA24201J	Data Structures and Algorithms	3	2	2	2	3	3	-	2	2	2
UCA24202J	Object Oriented Programming	3	2	2	2	3	3	-	2	2	2
UMS24202T	Mathematical Foundation	3	2	2	2	3	3	-	2	2	2
UCD24V01T	Essentials of Artificial Intelligence	3	3	2	2	3	3	-	2	2	2
	Multidisciplinary Course – I										
UCD24S02L	Quantitative Aptitude and Logical Reasoning	3	2	2	2	3	3	-	2	2	2
UNS24Y01L	NSS	-	3	3	3	2	1	-	2	-	-
UNC24Y01L	NCC	-	3	3	3	2	1	-	2	-	-
UNO24Y01L	NSO	-	3	3	3	2	1	-	2	-	-
UYG24Y01L	YOGA	-	3	3	3	2	1	-	2	-	-
UCA24301J	Programming using Java	3	2	2	2	3	3	-	2	2	2
USA24302J	Database Management System	3	2	2	2	3	3	-	2	2	2
UMS24303T	Statistical Methods	3	2	2	2	3	3	-	2	2	2
	Minor Elective – I										
	Multidisciplinary Course – II										
UCA24P01L	Internship - I	3	3	2	1	3	3	2	2	2	2
USA24401J	Python Programming	3	2	2	2	3	3	-	2	2	2
UMS24D01T	Resource Management Techniques	3	2	2	2	3	3	-	2	2	2
UMS24D02T	Numerical Methods	3	2	2	2	3	3	-	2	2	2
	Minor Elective – II										
	Minor Elective – III										
UEN24S01L	Communication Skills	-	3	3	3	2	1	-	2	-	-
UCD24S03J	Industry Oriented Employability and Leadership Skills	-	3	3	3	2	1	-	2	-	-
UMI24Y01L	My India Project	-	3	3	3	2	1	-	2	-	-
UCA24D03J	Computer Networks	3	2	2	2	3	3	-	2	2	2
UCA24D04J	Windows Programming	3	2	2	2	3	3	-	2	2	2
UCA24D05J	Open Source Technologies	3	2	2	2	3	3	-	2	2	2
UCA24D06J	Operating Systems	3	2	2	2	3	3	-	2	2	2
UCS24E04J	Minor Elective – IV										
	Multidisciplinary Course – III										
UES24V01T	Environmental Studies	-	3	3	3	2	1	-	2	-	-
UCD24S04J	Career Readiness and Professional Skills	-	3	3	3	2	1	-	2	-	-
UCA24P02L	Internship – II	3	3	2	1	3	3	2	2	2	2
USA24D07J	Cloud Computing	3	2	2	2	3	3	-	2	2	2
UCA24D08J	Web Development using AngularJS and MongoDB	3	2	2	2	3	3	-	2	2	2
UCA24D09T	Software Engineering and Testing	3	2	2	2	3	3	-	2	2	2

USA24D10T	Wireless Communication and Mobile Computing	3	2	2	2	3	3	-	2	2	2
	Minor Elective – V										
	Minor Elective – VI										
UCS24P03L	Project Work	3	3	2	1	3	3	2	2	2	2
UCD24V02T	Universal Human Values	-	3	3	3	2	1	-	2	-	-
UCA24D11T	Research Methodology in Computer Applications	3	2	2	2	3	3	-	2	2	2
UDS24D12T	Data Analytics for Project Management	3	2	2	2	3	3	-	2	2	2
UCA24D13J	Programming using C#	3	2	2	2	3	3	-	2	2	2
UCA24D14J	Internet of Things	3	2	2	2	3	3	-	2	2	2
UCA24D15J	Object Oriented Analysis and Design	3	2	2	2	3	3	-	2	2	2
UCA24D16J	Computer Vision	3	2	2	2	3	3	-	2	2	2
	Minor Elective – VII										
	Minor Elective – VIII										
UCA24D17J	Web Development using Node JS and MongoDB	3	2	2	2	3	3	-	2	2	2
USA24D18J	Cyber Security	3	2	2	2	3	3	-	2	2	2
UCA24D19J	Big Data Analytics	3	2	2	2	3	3	-	2	2	2
USA24D20J	Blockchain Technology	3	2	2	2	3	3	-	2	2	2
UCA24P04L	Research Project and Dissertation	3	3	2	1	3	3	2	2	2	2
UCA24P05L	Professional Internship	3	3	2	1	3	3	2	2	2	2

Abbreviations

CLR – Course Learning Rationale
CLO – Course Learning Outcomes
PLO – Programme Learning Outcomes
SLO – Session Learning Outcomes
BLoT – Bloom's Level of Thinking
CLA – Continuous Learning Assessment

SEMESTER - I

Course Code	ULT24AE1J	Course Title	Tamil - I	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

Course Offering Department	Tamil	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1	மரபிலிருந்து மாற்றம் பெற்ற புதுக்கவிதை மரபின் சிந்தனைகளை அறியச்செய்தல்
CLR-2	நவீன கவிதையின் வழி மனித வாழ்வியல் விழுமியங்களைத் தெரியச் செய்தல்
CLR-3	சிற்றிலக்கியங்கள், காப்பியங்கள்கற்பிக்கும் தமிழ்ச் சமூகத்தின் வாழ்வியலை அறியச் செய்தல்
CLR-4	நவீன தமிழ் இலக்கிய வளர்ச்சி வரலாற்றைப் புரியச் செய்தல்
CLR-5	மொழிப்பயிற்சி வழி மொழியின் பல்வேறு நுட்பங்களைத் தெரியச்செய்தல்

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes										
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	புதுக்கவிதை உருவாக்கித்தந்த புதிய சிந்தனைக்களங்களை அறிந்து கொள்ளுதல்	✓	✓	-	-	2	75	60	3	-	3	-	-	-	-	3	-	-
CLO-2	நவீன கவிதைகள் வழி மாற்றம் பெற்று வரும் மானுடவிழுமியங்களைத் தெரிந்துகொள்ளுதல்	✓	✓	✓	-	2	80	70	-	-		2		3	3	-	-	-
CLO-3	தமிழ்ச்சமூகத்தின்இடைக்காலவாழ்வியல்முறைகளைஉணர்ந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	65	3	-	3	-		2	-	-	-	-
CLO-4	நவீனஇலக்கியவரலாறுவழிதமிழ்க்கல்விவரலாறு, சமூகவரலாறுபெற்றவளர்ச்சிநிலைகளைத்தெரிந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	70	-	3	-	-	1	2	-	-	-	-
CLO-5	மொழியின்நுட்பங்களைத்தெரிந்துமொழிஆளுமையோடுசெயல்படும்திறன்பெறுதல்	✓	✓	✓	✓	3	80	70	3	3	-	2	-	-	-	-	-	-

Sessions	CLO - 1 12	CLO - 2 12	CLO - 3 12	CLO – 4 12	CLO – 5 12
SLO-1	தமிழ்க்கவிதைமரபு	நவீனகவிதைதோற்றம், வரலாறு	தமிழரின்வீரமரபு - போர்விழுமியங்கள்	சிற்றிலக்கியத்தோற்றம் – வகைமை	தமிழ்உரைநடைமரபு – உ.வே.சா. வின்பங்களிப்பு
SLO-2	புதுக்கவிதைஉருவாக்கம்,புதுக்கவிதைவளர்ச்சிநெறிகள்	நவீனகவிதைகளில்செல்நெறிகள்	பரணிஅறிமுகம்பரணி இலக்கியங்கள்	பிள்ளைத்தமிழ் - உலா - தூது	உ.வே. சா. வின்ராஜவைத்தியம்
SLO-3	பாரதியார்பன்முகஆளுமைத்திறன்	கவிதைமொழி - நவீனகவிஆளுமைகள்	தலைவனின்வீரம் - கலிங்கத்துப்பரணி 477, 490	புதுக்கவிதையின்தோற்றமும் மொழியும்	நாட்டுப்புறமரபில்சிறுதெய்வவழிபாடு
SLO-4	பாரததேசம்பாரததேசத்தின்வளம்	கவிதையில்நாட்டுப்புறவடிவம்	தமிழ்இலக்கியமரபில்தூதுஇலக்கியங்கள்	புதுக்கவிதையில்சமூகம் - புதுக்கவிதையும்இதழ்களும்	கழனியூரனின்பொன்காத்தஜயனார்
SLO-5	வெள்ளிப்பனிமலையின்மீதுலவுவோம்…	பெண்களின்கல்விநிலை -இளம்பிறை – அம்மா	தமிழின்பெருமை – தமிழ்விடுதூது (184 – 186)	மணிக்கொடிஇதழ்,எழுத்துஇதழ்,வானம்பாடிஇதழ்	பிழைநீக்கிஎழுதும்நுட்பங்கள்
SLO-6	20 ஆம்நூற்றாண்டுக்கவிதைமரபில்பாரதிதாசன்	ஆண்பெண்சமத்துவமும்ப.கல்பனா – கீறல்விழுந்தமாலைக்காலங்கள்	செய்யுள்மரபில்கலம்பகஇலக்கியங்கள்	சிறுகதைதோற்றம்– சிறுகதைவளர்ச்சி	எழுத்துப்பிழை – ந - ண - னல,ள,ழ, ர, றவேறுபாடுஅறிதல்
SLO-7	பாரதிதாசன் - அழகின்சிரிப்பு ஆல் - ஆயிரம்கிளைகள்கொண்டஅடிமரம்	விளிம்புநிலைவாழ்வியல்: திருநர்களும்சாதனைகளும்	கையறுநிலை – நந்திக்கலம்பகம் - வானுறுமதியை (110)	சிறுகதைவரலாறு - சிறுகதைஆசிரியர்கள்	தொடர்பிழைஒருமைபன்மைவேறுபாடு
SLO-8	ஆல் - ஆயிரம்கிளைகள்கொண்டஅடிமரம்	திருநங்கைகுணவதி - சமூகப்பார்வை	தமிழ்இலக்கியமரபில் குறவஞ்சிஇலக்கியங்கள்	இதழ்களும்சிறுகதையும்	பிறமொழிச்சொற்களைநீக்கிஎழுதுதல், ஷ,ஜ,ஸ,ஹமாற்றொலிகள்
SLO-9	வானம்பாடிக்கவிஞர்களும்மு.மேத்தாவும்	புலம்பெயர்வாழ்வியல் - வலியும்நம்பிக்கையும்	குற்றாலக்குறவஞ்சி – ஆடுமரவீனுமணி (3)	புதினம்தோற்றம் - புதினம்வளர்ச்சிவரலாறு	தமிழில்சொல்வகைகள்சொல்லும்பயன்பாடும்
SLO-10	மனிதநேயம் - மு.மேத்தாவின் மனிதனைத்தேடி	ஸர்மிளாஸெய்யித் – புராதனஊர்	காப்பியஇலக்கணம் - காப்பியவகைமைகள்	புதினத்தின்வகைமைபுதினஆசிரியர்கள்	பெயர்ச்சொற்கள்பெயர்ச்சொற்களும்வகைகளும்
SLO -11	தமிழ்க்கவிதையில்சுற்றுச்சூழலியல்	காலந்தோறும்கவிதைவடிவில்மாற்றங்கள்.ஹைக்கூ – மு.முருகேஷ்	சிலப்பதிகாரம் – அறிமுகம் கட்டுரைக்காதை	தமிழ்இலக்கியத்தில்உரைநடைக்கூறுகள் - உரைநடையின்தோற்றம்	வினைச்சொற்கள்அறிதல்

SLO -12	இயற்கையும்சமத்துவமும் பழனிபாரதியின்காடு	லிமரைக்கூ – ஈரோடுதமிழன்பன்சென்ரியூ – மாமதயானை	ஊழ்வினை– கோவலனின்முற்பிறப்பு வரலாறு	தமிழில்உரைநடைவளர்த்தஅறிஞர்கள்	தமிழில்பெயரடை, வினையடைஅறிதல்

Resources			
1	முல்லைக்காடு, தொகுப்பும்பதிப்பும் - தமிழ்த்துறைஆசிரியர்கள், எஸ்.ஆர்.எம். அறிவியல்மற்றும்தொழில்நுட்பக்கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2023	4	வல்லிக்கண்ணன், புதுக்கவிதைதோற்றமும்வளர்ச்சியும், ஆழிபதிப்பகம், சென்னை, 2018
2	கா. சிவத்தம்பி, தமிழில்சிறுகதைதோற்றமும்வளர்ச்சியும், என்.சி.பி.எச்., சென்னை, 2013	5	மு.வரதராசன், தமிழ்இலக்கியவரலாறு, சாகித்தியஅக்காதெமி, 1972.
3	மதுரைதமிழ்இலக்கியமின்தொகுப்புத்திட்டம்	6	தமிழ்இணையக்கல்விக்கழகம்

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50% weightage)
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 * (10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Course Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. P.R.Subramanian, Director, Mozhi Trust, Thiruvanmiyur, Chennai – 600 041.	1	Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literaturel, Pondicherry University, Pondicherry	1	Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST, KTR.
				2	Dr. R. Ravi, Assistant Professor and Head, Dept. of Tamil, FSH, SRMIST, VDP.
				3	Mr. G. Ganesh, Assistant Professor, Dept. of Tamil, FSH, SRMIST, RMP.
				4	Dr. T.R.Hebzibah beulah Suganthi,Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.
				5	Dr. S.Saraswathy, Assistant Professor,Dept. of Tamil, FSH, SRMIST, KTR.

Course Code	ULH24AE1J	Course Title	Hindi – I	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

Course Offering Department	Hindi	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1	To Communicate in Hindi without any inhibition
CLR-2	To appreciate the Hindi language in its various forms
CLR-3	To analyze the different writing styles
CLR-4	To display moral and social values in the field of social Responsibility and Integrity
CLR-5	To be willing listeners and Translators-where need be

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	To Understand the Philosophy of life and living through Stories	✓	✓	-	-	2	85	75	3	2	3	-	-	2	-	-	-	-
CLO-2	To Examine Travelogue writing and Sketch	✓	✓	✓	-	2	85	75	3	-	2	-	3	-	3	-	-	-
CLO-3	To Identify Irony and essay - based writing	✓	✓	✓	✓	3	85	75	-	3	-	3	3	2		-	-	-
CLO-4	Evaluate the various social issues depicted in the prose	✓	✓	✓	✓	3	85	75	2	-	2	3	-		2	-	-	-
CLO-5	To Understand the fundamental principal of Translation	✓	✓	✓	✓	3	85	75	-	3	-	3	3	2		-	-	-

Session	CLO – 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	12	12	12	12	12
SLO-1	KAHANI KI AVDHARNA	REKHACHITRA & YATRAVITRANT	NIBANDH	NATAK	ANUVAD& PARIBHASHIK SHABDAVALI
SLO-2	SWARUP AUR PARIBHASHA	AVDHARNA EVM SWAROOP	NIBANDH KI AVDHARNA EVM SAWROOP	AVDHARNA EVM SAWROOP	ARTH EVM PARIBHASHA
SLO-3	KAHANI KE TATVA EVM MAHATWA	MAHATVA AUR UDDESHYA	MAHATVA EVM UDDESHYA	TATWA EVM PRAKAR	SWARUP EVM PRAKAR
SLO-4	PARIKSHA- PREMCHAND	GESHA REKHACHITRA	KUTAJ- NIBANDH HAJARI PRASHAD DIVEDI	UDDESHYA	MAHATVA
SLO-5	VISLESHAN	PATH KA VISHLESHAN	LEKHIAK PARICHAY	NATAK KA MAHATVA	UDDESHYA

SLO-6	UDDESHYA	GURU SHISHYA KA SAMBANDH	SHANGHARSHIL JEEVAN	RANGMANCH KA PARICHAY	ANUVAD KA PRAYOJAN EVM PRAYOG
SLO-7	MALBE KA MALIK- MOHAN RAKESH	THELE PAR HIMALAY (YATRAVITRANT)	PATH KA MAHATVA	LEKHAK PARICHAY	SHROT EVM LAKSHYA BHASHA KA GYAN
SLO-8	LEKHAK PARICHAY	YATRAVITRANT KA MAHATVA	BHOLARAM KA JEEV- (VYANGYA) HARISHANKAR PARSHAI	NATAK KA VISLESHAN	ANUVAD KA DAYITVA
SLO-9	BATWARE KA YATHARTH VARNAN	YATRA KA YATHARTH CHITRAN	VYANGYA KI AVADHARNA	LALCH KA DUSHPARINAM	PARIBHASHIK SHABDAVALI
SLO-10	TATKALIN PARISHTHITI KA VARNAN	PATH KA VISLESHAN	PATH KA VIHLESHAN	GURU SHISHYA SAMBANDH	TAKANIKI SHABDAVALI KA MHATVA
SLO-11	KAHANI KA VISHLESHAN	HIMALAY KA LOK JEEVAN	SARKARI TANTRA KA KHOKHLA RUP	MAHATTAKANKSHI KA DUSHPARINAM	VIVIDH PRAYOG
SLO-12	KAHANI KA UDDESHYA	HIMALAY KA VARNANA	SANVEDANSHIL BHAVANA	TATKALIN SAMAJIK VYAVASTHA KI CHARCHA	SHABDAVALI KI AVSHYAKTA

Resources			
1	**Samanya Hindi, Srijonlok Publication, 2023, New Delhi**	4	Bhakti Andolan Aur Surdas Ka Kavya – Manager Pandey
2	Kabir – Hazari Prasad Dwedi	5	Bihari – Vishvnath Prasad Mishr
3	Surdas – Ram Chandra Shukl	6	Aadhunik Vigyapan Aur Jansampark – Taresh Bhatia

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4 * (10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Ms. Reetha Govindan, Senior Manager (Rajbhasha)	1	Dr. S. Padmapriya, Professor and Head, Pondichery University, Kalapet, Puducherry - 605014	1	Dr. S Preeti. Associate Professor, SRMIST
2	Mr. Vipin Kumar Jha, Senior Translation Officer (ALUMNI)			2	Dr. Md. Shwahidul Islam, Assistant Professor, SRMIST
				3	Dr. S. Razia Begum, Assistant Professor, SRMIST
				4	Dr. Nisha Murlidharan Assistant Professor, SRMIST

Course Code	ULF24AE1J	Course Title	French – I	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

Course Offering Department	French	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1	Extend and expand their savoir-faire through the acquisition of current scenario
CLR-2	Enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French
CLR-3	Make them learn the basic rules of French Grammar.
CLR-4	Develop strategies of comprehension of texts of different origin
CLR-5	Strengthen the language of the students both in oral and written

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn ,Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2	
CLO-1	To acquire knowledge about French language	✓	✓	-	-	2	85	75	3	2	3	-	-	2	-	-	-	-	
CLO-2	To strengthen the knowledge on concept, culture, civilization, and translation of French	✓	✓	✓	-	2	85	75	3		2	-	3	-	3	-	-	-	
CLO-3	To develop content using the features in French language	✓	✓	✓	✓	3	85	75	-	3	-	3	3	2	-	-	-	-	
CLO-4	To interpret the French language into other language	✓	✓	✓	✓	3	85	75	2		2	3	-	-	2	-	-	-	
CLO-5	To improve the communication, intercultural elements in French language	✓	✓	✓	✓	3	85	75	-	3	-	3	3	2	-	-	-	-	

Session	CLO - 1	CLO - 2	CLO – 3	CLO - 4	CLO - 5
	12	12	12	12	12
SLO-1	Contacts, Emma la championne	Les verbes du premier groupe	Qu'est-ce qu'ils font?	Portraits	Les verbes du deuxième groupe –
SLO-2	Les nombres à partir de 31	La liaison	Où est mon sac	Un casting	Les pronoms personnels toniques
SLO-3	Les pays, les nationalités	Entrer en contact	Quelques objets	Le Petit Spirou	Les verbes faire et lire
SLO-4	Les jours de la semaine, Les jours	Présenter et se présenter	Les professions	L'aspect physique	Les Sons
SLO-5	Les mois de l'année, Les animaux domestiques	Demander et dire la date	La formation du féminin (2)	Le caractère	Décrire l'aspect physique
SLO-6	La famille (1)	Une rencontre.	Qu'est-ce que c'est?	les états d'âme	Demander et dire l'heure

SLO-7	La formation du féminin (1)	Contacts	C'est / Il est (1)	Les prépositions de lieu (1)	Elle est comment?
SLO-8	Les adjectifs possessifs	Emma la Championne	La phrase négative (1)	La famille (2)	Portraits
SLO-9	La phrase interrogative	Mots et expressions	Les verbes aller et venir	La formation du féminin	Mots et Expressions
SLO-10	Les nombres	Grammaire	Les formules de politesse	La formation du pluriel (2)	Grammaire.
SLO-11	Intonation et est-ce que	Communication	C'est qui?	Il y a	Communication
SLO-12	Les exemples	Les verbes du ER –groupe	Mots et Expressions	Les articles contractés	Les concepts

Resources			
1	''La Nouvelle Génération-AI'' Méthode de français, Marie-Noëlle COCTON, P. DAUDA, L. GIACHINO, C. BARACCO, Les éditions Didier, Paris, 2018.	4	https://www.elearningfrench.com/learn-french-grammar-online-free.html
2	Cahier d'activités avec deux discs compacts.	5	https://www.lawlessfrench.com/grammar
3	https://www.fluentu.com/blog/french/french-grammar	6	https://blog.gymglish.com/2022/12/15/basic-french-grammar

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*		
		(10 %)		(10 %)		(20 %)		(10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Kavaskar Danasegarane, Language Specialist, Process Expert Maersk Global Service Center Pvt. Ltd	1	Dr. C Thirumurugan, Professor, Department of French, Pondicherry University	1	Mr. Kumaravel K. Assistant Professor and Head, SRMIST
2	Mr. Vipin Kumar Jha, Senior Translation Officer (ALUMNI)			2	Ms. Abigail A, Assistant Professor, SRMIST

Course Code	ULE24AE1J	Course Title	English	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

Course Offering Department	English	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1 CLR-2	Develop an understanding and sensibility of human consciousness through gender inclusive curriculum Enhance the abilities of deeper understanding to stay with integrity with the fellow human beings
CLR-3	Develop the overall language competency of the learner
CLR-4	Develop proficient language skills
CLR-5	Learn to express the thoughts clearly, develop logical arguments and enhance the overall communication skills.
CLR-1	Develop an understanding and sensibility of human consciousness through gender inclusive curriculum

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural Inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	Cultivating Critical Thinkers and Creative Communicators	Advancing Knowledge and Scholarship in Language	
CLO-1	Analyze different literary texts to identify the representation of issues related to gender, and class	✓	✓	-	-	2	85	75	3	3	3	3	2	1	-	3	3	3	
CLO-2	Apply critical thinking skills to analyze and respond to academic texts.	✓	✓	✓	-	2	85	75	3	2	2	3	2	1	-	-	3	3	
CLO-3	Critically evaluate and discuss contemporary issues through online articles.	✓	✓	✓	✓	3	85	75	3	2	2	3	2	1	-	3	3	3	
CLO-4	Refine their general writing skills	✓	✓	✓	✓	3	85	75	3	3	3	3	2	1	-	-	3	3	
CLO-5	Improve their language application skills	✓	✓	✓	✓	3	85	75	3	3	3	3	2	1	-	3	3	3	

Session	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	POETRY	**SHORT STORIES**	**LEARNING ABOUT WRITING**	**LEARNING ABOUT SPEAKING**	**REFLECTION OF THE LANGUAGE LEARNING**
	12	**12**	**12**	**12**	**12**
SLO-1	Introduction to the poet- Sukirtharani- Reading and recitation of the poem – Debt Analysis and Critical interpretation of the poem.	Introduction to the short story writer Katherine Mansfield. Reading the story- The Doll's House Explaining the story through depiction of characters and representation of injustices.	Introduction to Creative Writing. Explaining the elements of creative writing. Grouping the Students belonging to States other than Tamilnadu	Building the discourse- The significance of conversation and the key elements of discourse- Art of conversation in digital and verbal discourse- Lee Mockobe's A Powerful Poem of what it means to be a Transgender. TEDX TALK- POEM RECITATION	Reflecting the learning. - Review writing Explaining the process of reviewing and the method of reviewing. Choosing the subject for reviewing.
SLO-2	Introduction to the poet Kalki Subramaniyam. Reading and recitation of the poem Phallus I cut. Analysis and Critical interpretation of the poem. Part-1	Analysis and critical interpretation of the short story Doll's House.	Stand-up comedy show - translate the audio content in English. (any regional language) Practice the writing activity -creative ways of engaging in translation.	Reflecting on the style and the tone of the poem. Practicing conversation	Choosing and planning the topic for students- group 1 and group 2
SLO-3	Analysis and Critical interpretation of the poem. Phallus I cut- Part-2	Class room activity- reviewing characters Group Discussion- social consciousness	Correction of errors- attempting to translate. Identifying equivalent terms to certain regional words - learn the art of translation.	Classroom- Speaking activity- reflection about the issues regarding gender expression and gender identity. Reviewing activity- group discussion- communicating effectively- importance	Choosing and planning the topic for students- group 3 and group 4

SLO-4	Introduction to the poet -Imtiaz Dharker. Reading and reciting the poem Purdah 1. Analysis and Critical interpretation of the poem- Purdah 1- part 1	Speaking activity- society and its portrayal in the short story- Magnifying and analyzing the characters from contemporary perspective	Introducing famous art works and the contexts of creation. Salvador Dali- The Face of War Pablo Picasso- Guernica Edward Munch- The Scream Pieter Bruegel- The Tower of Babel. Understanding the art works- Part 1	Introducing Content writing in Social Media- the importance of content writing.	Introducing the students to the review of the various works. Understand the review process how effectively a review of any work can be done.
SLO-5	Analysis and Critical interpretation of the poem- Purdah 1- part 2	Introduction to the writer Haruki Murakami. Reading the Confessions of a Shinawaga monkey. Discussion and analysis of the Confessions of a Shinawaga monkey.	Understanding the art works- Part 2 creative and/ or thoughtful writing - contemporary themes of modern day	BLOG WRITING - Subtleties Of Workplace Inclusion: Mental Health And Queer Community- Salik Ansari. Reading the text- content in the blog by the students- Reading Activity	Reviewing -record -post in the social media pages of SRMIST
SLO-6	Reading and reciting the poem Purdah 2 Analysis and Critical interpretation of the poem- Purdah 2- part 1	Group discussion activity reflecting the understanding of the character Shinagwa monkey Speaking activity- review on life and existentialism and identity crisis	Course instructor guidance- Classroom activity for creative writing- discussion on generation of ideas discussion on working and reflection of ideas	Analysing the text- content in the blog by the students- Discussion Activity writer's conversation with the readers - the blog in other blog articles.. Practice blog writing	Thoughtful conversation with your team member post the same in the official social media page of SRMIST. Choosing the team based on the abilities that are comfortable to match the peer members
SLO-7	Analysis and Critical interpretation of the poem- Purdah 2- part 2	Introduction to Crystal Wilkinson Reading Endangered Species: Case 47401.	Elements of writing Incorporate the elements of story in story writing	Apprehending Life by reading the texts of influence- Chimamanda Ngozi Adiche's Notes on Grief- A BRIEF NOTE, We should all be Feminists- An Essay.	Choosing the topics for a thoughtful conversation Planning and preparation for the script of conversation with a team member

SLO-8	Introduction to the poet Arundathi Subramanian. Reading and reciting the poem- Home Student activity- recitation Analysis and Critical interpretation of the poem- Home	Discussion and analysis of Endangered Species: Case 47401.	Students -writing abilities- building stories- a visual treat of variety of pictures.	Class discussion- essay by the author -subjective depiction of life. Understand -subjective opinions - perspectives- Practising the task multiple times with all the students in the classroom.	Drafting , editing and revising the script of conversation and enacting the conversation with the team members Enactment -proper rehearsal - final performance -conversation- whole performance should be recorded. The recording should be posted in the official media page and social handles of SRMIST.
SLO-9	Recollection of study of the writing styles and intentions of the poets prescribed in the syllabus.	Introduction to C.S Lakshmi also known as Ambai. Reading the short story- In a Forest, A Deer.	Practice -write stories - pictures given or shown. Classroom activity- evaluation of writings ansd reflections for suggesting, correction and improvement	Interposing opinions in famous interviews- FII Interviews: Tasveer Co-Founder And Filmmaker Rita Meher On The Seattle Legislation, Minority Rights And The Fight Against Oppression- INTERVIEW- Analayisng the text and discussing the aspects of an interview	work for this social post - reflect on their experience of learning communicative English course and the testimonial has to be recorded and posted in the social media pages of SRMIST..
S-10	Group Discussion activity for students to reflect up on gender consciousness	Discussion and Analysis of In a Forest, A Deer.	A writing task to write a script is introduced in the classroom.	Students -enact as interviewer and interviewee and practice building the discourse.	Involving the students for the project work. Introducing what is project work and inculcating the interest -Giving instructions to do the project works -

SLO-11	Revision of the poems Debt and Phallus I cut, Purdah 1 and Purdah 2	Classroom activity- speaking about identity, power of women and contemporary issues and perspectives up on women like Thangam Atthai	Creative scripts inspiring from the dialogues of their favourite films by changing the scenario to their own wish according to their own whims and fancies. Creative writing -writing news reports. recreated with new characters, places, scenes, incidents.	Certain role plays like celebrity personalities, political personalities -conduct the interview and be the interviewer and interviewee. The art of conversation and the ability to build a discourse Reflecting on the points- Student reviewing activity- art of conversation in the text	Discussion of ideas and generation of creative ideas- Preparation for next semester. Assignment on any piece of creative writing (OR) Presentation- Mastering the art of Public Speaking. (OR) Project on compiling the real life influential events on gender inclusive issues and a presentation of the same. Interview Scripting /Blog writing.- Guidance
SLO-12	Revision of the poem Home. Creative activity for the students to reflect up on gender consciousness, influence of religion on women freedom.	Retrospecting the writing styles of the authors- Katherine Mansfield, Haruki Murakami, Crystal Wilkinson and Ambai. Overall Revision- The Doll's House, Confessions of a Shinawaga Monkey, Endangered Species: Case 47401 Classroom activity- speaking about racism in contemporary society- an attempt to understand the issues prevailing in the society from the perspectives of students	Watch debate shows - summarising the arguments Enhance -descriptive writing skill. Repetitive practice and continuous assessment - writing skiills-master the writing skill.	Reflecting on the points- Student reviewing activity- art of conversation in the text The evaluation and assesment of the conversation -constructive feedbacks to the students.	Reflection, Evaluation and Assessment of ideas- Students can opt any of the project from the given choice. Ready for the next semester- reflection of the learning through assignments practiced

Resources			
1	Horizon- English Text Book – Compiled and Edited by the Faculty of English Departement, FSH, SRMIST, 2023	5	The Art of Public Speaking by Stephen E. Lucas- 2019
2	The Creative Writing Coursebook: Forty Authors Share Advice and Exercises for Fiction and Poetry by Julia Bell and Paul Magrs- 2001	6	Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds by Carmine Gallo – 2014
3	On Writing: A Memoir of the Craft by Stephen King 2000	7	The Anatomy of a Book Review: A Guide for College Students by Ronald J. Weber 1994
4	The Writing Life: Writers on How They Think and Work edited by Marie Arana -2003	8	How to Write a Simple Book Review: It's easier than you think! by Allyson R. Abbott 2013

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*		
		(10 %)		(10 %)		(20 %)		(10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Krishna Raj, Sutherland Technologies	1	Dr. J Mangayarkarasi Associate Professor and Head, Department of English, Ethiraj College for Women, Chennai	1	Dr. Pushpanjali Sampathkumar, Assistant Professor, Department of English, FSH, SRMIST
		2	Dr. K S Antonysamy Associate Professor and Head, Department of English, Loyola College, Chennai	2	Dr. Dr. Shanthichitra, Associate Professor, & Head, Department of English, FSH, SRMIST
				3	Dr Anchal Sharma, Professor and Head, Department of EFL SRMIST
				4	Dr T Sridevi, Assistant Professor, FSH, SRMIST
				5	Dr Shanmuga Priya, Assistant Professor SRMIST

Course Code	UCA24101J	Course Title	Digital Logic Design	Category	C	Discipline Core Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating	Independent Thinking, Analytical Reasoning, Learning to Learn, Research	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	To learn the concepts of basics of Digital Logics																	
CLR-2	To impart in-depth knowledge of Logic Gates																	
CLR-3	Understand the principles of Boolean Algebra																	
CLR-4	Basic knowledge of Combinational Circuits and it Applications																	
CLR-5	Basic knowledge of sequential Circuits and it Applications																	

CLO	At the end of this course, learners will be able to:																		
CLO-1	Have a thorough Understanding of the Fundamentals of Digital Logic and it Fundamentals	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Understand the concepts of logic gates and its uses	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Real time applications of Boolean Algebra	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Design and implementation knowledge of Combinational Circuits	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Design and implementation knowledge of Sequential Circuits	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	Number Systems	Boolean Expressions	Combinational Circuits	Sequential Circuits	Counters
	18	18	18	18	18
SLO-1	Number System and its types Base conversions	Minterms and Maxterms Sum of Products	Combinational Logic - Introduction Designing of a Logic Circuit Diagram	Sequential Circuit - Introduction Latches	Counters - Introduction A Basic Design Counter
SLO-2	Binary codes and its types Code conversions	Product of Sums methods Conversions of SOP to POS	Adders : Quarter, Half and Full Adders Subtractors: Half, Full Subtractors	Flip Flops - Introduction RS Flip Flop	Classification of Counters Asynchronous Counters
SLO-3	Basics of Logic Gates and Derived Gates Truth Tables	Simplifying Boolean Expressions using theorems Derivation of a Boolean Functions	Design of Adder Circuits Design of Subtractor Circuits	JK Flip Flop D Flip Flop	Synchronous Counters Syn Vs Asyn Counters
SLO-4-6	Lab1 : Verification of Basic Gates and Derived Gates	Lab 4: Verifications of Distributive Law	Lab 7: Half Adder and Full Adder	Lab 10: Implementation of DeMultiplexer	Lab 13: Ring Counters
SLO-7	Universality of NAND Gate Universality of NOR Gate	Karnaugh Map - Introduction and its uses Types of K-Map	Multiplexer Implementation of a Boolean expression using a Multiplexer	T - Flip Flop Edge Triggered	Ripple Counters MOD Counters
SLO-8	Duality of Logic Gate Representation Boolean Algebra - Introduction	Rules for constructing K-Map Two and Three Variable K-Map	De Multiplexer Encoder	Master Slave Flip Flop Registers Architecture	UP DOWN Counters Ring Counter
SLO-9	Logical Operations AND OR NOT Hierarchy of Logic Circuits	Four Variable K-Map Simplifying Boolean Expressions using K-Map	Decoder Decimal -to- BCD encoder	Shift Registers Register with parallel load	Shift Counters Decade
SLO-10-12	Lab2:NAND as Universal Gate NOR as Universal Gate	Lab 5-Simplifying Boolean Expressions using theorems	Lab 8:Half Subtractor and Full Subtractor	Lab 11: Implementation of Shift Registers and Serial Transfer	Lab 14: Implementation of DOWN Counter
SLO-13	Evaluating Logic Circuits Implementing Circuits from Boolean Expressions	Don't Care conditions Determination Prime Implicant Method	Parity Generator Parity Checker	Four-bit Serial in Serial Out Shift register Shift Registers Operations	Memory - Introduction Basic terms and ideas
SLO-14	Boolean Functions Duality Principle, Complements	Boolean Arithmetic - Introduction Binary Addition	Checksum Code Conversions	Serial-to-Parallel Shift Register Design of Serial to Parallel	Magnetic Memories Memory Addressing
SLO-15	Laws and Theorems Laws of Intersection, Union, Absorption, Involution, Demargan's Theorems	Binary Subtractions Various Representation of Binary Numbers	Programmable Array Logic Programmable Logic Array	Parallel-to-Serial Shift Register Design of Parallel to serial	Types of ROM Types of RAM
SLO-16-18	Lab 3:Laws of Boolean Expressions	Lab 6: Implementation of Binary Addition and Subtraction	Lab 9: Implementation of Multiplexer	Lab 12: Four Bit Binary Shift Counters	Lab 15: Implementation of DOWN Counter

Resources			
1	Ananthi Sheshasaayee,J.G. Sheshasaayee ,Digital Logic Fundamentals , Margham Publications, 2005	3	Leach D.P, Malvino A.P, Digital Principles & Applications, TM, 2002
2	Vijayendran.V, Digital Fundamentals,S.V. Publishers, 2003	4	Moris Mano.M, Digital Logic and Computer Design, Pearson, 2001

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	15	15
2	Understand	20	20	20	20	15	15	20	20	15	15
3	Apply	20	20	20	20	20	20	20	20	25	25
4	Analyze	20	20	20	20	20	20	20	20	25	25
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

ProfessionalExperts		HigherInstitutionExperts		InternalExperts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan,Professor,UniversityofMadras,Chennai	1	Dr.V.Nisha , Assistant Professor, SRMIST, KTR Campus

Course Code	USA24102J	Course Title	Programming for Problem Solving	Category	C	Discipline Core Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
CLR-1	Introduction to Programming Language	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
CLR-2	Understanding basic element of programming language.																		
CLR-3	Use and implement data structures like arrays and structures to obtain solutions.																		
CLR-4	Customizing functions and procedures to encourage reusability																		
CLR-5	Establish interaction between stored files and the application code																		
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn ,Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2	
CLO-1	Evolution of Programming Language	✓	✓	-	-	2	85	75	1	3	-	-	1	-	3	-	2	2	1
CLO-2	Choose operators, control structures to solve the problem optimally	✓	✓	✓	-	2	85	75	2	3	2	1	2	2	3	-	1	2	1
CLO-3	Analyze the problem thoroughly and choose the prebuilt functions/ customize functions to solve the problem	✓	✓	✓	✓	3	85	75	1	3	1	3	1	3	3	-	1	1	2
CLO-4	Able to use dynamic memory allocation concepts for problems that demand	✓	✓	✓	✓	3	85	75	3	3	3	2	3	3	3	-	2	3	3
CLO-5	Defend the need for files storage and the access privilege modes	✓	✓	✓	✓	3	85	75	3	3	3	2	3	3	3	-	3	3	3

Sessions	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	Introduction to C	**Operators & Control Structures**	**Arrays & Structures**	**Functions & Pointers**	**Files**
	18	**18**	**18**	**18**	**18**
SLO-1	Evolution of Programming Languages Problem solving through programming	Arithmetic operators, Assignment operator, Increment and decrement operator, Comma, Arrow and Bitwise and sizeof operator Relational and logical Operators Character and Numbers: Manipulation	Understanding contiguous memory allocation Array : Advantages and Limitations	Formal and Actual Parameters Functions: Returning values	File Types: text and binary, File operations: basics File permissions and access privileges, Changing permissions
SLO-2	Writing algorithms/pseudo codes Drawing flowcharts	Expressions with pre / post increment operator Expression with conditional and assignment operators	String Basics String Declaration and Initialization	Advantages of using Functions Passing Array to Function	Writing contents to file , Reading file contents, Appending an existing file Difference: Append and write
SLO-3	Evolution of C language Program structure	Ternary operator L value and Rvalue in expression	Understanding String Functions: gets(), puts(), getchar(), putchar(), printf() String Functions: atoi, strlen, strcat, strcmp	Call by Value Call by Reference (An introduction on pointers shall be effective)	Writing contents to file, Reading file contents fscanf(),fprintf()
SLO-4-6	Lab 1: Basic Program	Lab 4: Operators and Expressions	Lab 7: Arrays : Multi-dimensional	Lab 10: Functions	Lab 13: File: reading and writing
SLO-7	Need for file header files Need for linkers and loaders	Operator precedence Type conversion	String Functions: sprint, sscanf, strrev, strcpy, strstr, strtok Need for tokenization	Nested functions Functions: advantages and limitations	fscanf(),fprintf(),fseek(),ftell(), fputc(),
SLO-8	Input and output statements: scanf,printf Identifiers, Variables and Scope and lifetime of variables,	Control Statements : Sequential, Branching, looping andJjump If, if-else, else if ladder	Need for user-defined data types Structures	Pointers and address operator sizeof Pointer Variable and Pointer Operator	fgetc(),fputs(),fgets() fputw(),fgetw(),
SLO-9	Keywords, Literals	Nested if, switch case for loop	Unions Accessing members of the structure	Pointer Declaration and dereferencing pointers void Pointers and sizeof void Pointers	feof(), remove(),ferror() End_of_file in file handling
SLO-10-12	Lab 2: Program using Input and Output Statements	Lab 5: Control Statements	Lab 8: Strings, structures and union	Lab 11: Pointers	Lab 14: File Handling fputw(),fgetw(), remove();

SLO-13	Expressions Single line and multiline comments	while loop do while	Accessing members of the structure Structures and arrays	Function and call by reference Functions and Returning array(use of pointers)	Processor Directives Predefined macros and macros
SLO-14	Data types classification: Basic data type, Derived data type, and User-defined data type	goto, break, continue, exit: Jump statements. Understanding jump statements with branch and iterative statements	Structure and arrays Nested structures	Structures and pointers :dynamic creation of data structures(list) Incrementing Pointers, Constant Pointers	conditional compilation Processor Directives
SLO-15	Constants and its types	Array Basic , Array Declaration, Initialization, manipulating one dimensional arrays with indices, Methods: sort, append, reverse, traverse, Manipulating two dimensional arrays with indices, Problems: matrix manipulations	Functions declaration and definition, Function prototypes, Defining and calling functions Prebuilt and user defined functions, Multiple functions, Recursion , recursive Functions, Scope of variables across functions	Pointers and strings, Function Pointers, Array of Function Pointers Null Pointers, Using sizeof(),malloc,calloc() File Handling, Open(),close()	#pragma Creating include and macros
SLO-16-18	Lab 3: Program using Operators	Lab 6: Arrays – One Dimensional	Lab 9: Functions	Lab 12: Pointers	Lab 15: Creating Macros

Resources

1	R. G. Dromey, “How to solve it by Computer”, Pearson Education, ISBN 0-13-433995-9	3	Reema Thareja, “Python Programming: Using Problem Solving Approach”, Oxford University Press;
2	The ‘C’ programming language by Kernighan and Ritchie, Prentice Hall	4	Stephen G. Krantz, “Problem Solving Techniques” , Universities Pres

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4* (10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	10	20	20	20	20
2	Understand	20	20	20	20	15	10	20	20	20	20
3	Apply	20	20	20	20	20	25	20	20	20	20
4	Analyze	20	20	20	20	20	25	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts	Higher Institution Experts	Internal Experts
1 Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1 Dr.S.Gopinathan, Professor, University of Madras, Chennai	1 Dr.S.Usha, Assistant Professor, SRMIST, KTR Campus

Course Code	UMS24101T	Course Title	Discrete Mathematical Structures	Category	C	Discipline Core Course	L	T	P	C
							4	0	0	4

Course Offering Department	Mathematics and Statistics	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1	To provide a strong foundations in discrete mathematics
CLR-2	To apply mathematical techniques for solving real life problems
CLR-3	Apply Boolean algebra, truth table, logic gates, in computer science and communication.
CLR-4	To enable the use of logical, graphical and algebraic techniques wherever relevant.
CLR-5	Understanding of computer science through the applications of Discrete Mathematics

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes										
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Problem solving in sets and relations. Gaining knowledge, solving the simple problems using elementary concepts.	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Understand the concepts of Graphs terminology Sub graphs, Acyclic, Euler path, Hamiltonian Path	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Logical knowledge through the Statements, connectives, arguments, validity of arguments and Normal forms using truth tables	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Gain the knowledge about Trees , Labeled Trees, Binary trees ,Rooted Trees , Spanning Trees Minimal Spanning Trees	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Apply the concepts of Boolean Algebra in real world problems related to Computer Science	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Session	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	Set Theory	Logics	Introduction to Graph Theory	Trees	Lattices and Boolean Algebra
	12	12	12	12	12
SLO-1	Introduction to Sets – simple examples.	Logic – Basic explanations	Graphs and Their Representation- Basic Terminology	Trees – Basic properties of tress	Partition of a set - Relation concepts
SLO-2	Properties of sets, Types of sets	Statements- simple compound	Drawings of Graphs – Special families of graph – Simple problems	Labeled trees	Matrix representation of relation – Hasse Diagrams - Lattices as posets

SLO-3	Venn diagram – Problems using Venn Diagram	Symbolic representation and Connectives explanations	Incidence graphs -Adjacency matrices – Vertex degree matrices	Undirected Trees – Binary trees	Definition of Lattices- Properties of Lattices - Problems on Lattices as posets
SLO-4	**Tutorial**	**Tutorial**	**Tutorial**	**Tutorial**	**Tutorial**
SLO-5	Relation definitions – Types of Relations	Problems using Truth Tables – logical equivalence	Isomorphism of Graphs – Sub graph	Rooted Trees and Branches –	Introduction to Boolean Algebra- basic definitions.
SLO-6	Problems on Relations	Tautological implications	Acyclic graph –Digraph – Simple problems	problems based on concepts	Problems using the postulates of Boolean Algebra
SLO-7	Reflexive-Symmetric-Transitive – basic Explanations	Arguments- validity of arguments and normal forms	Euler path and circuits	Spanning Trees - Minimal Spanning Trees	Expression of a Boolean function By Truth table method – Properties of Boolean Algebra
SLO-8	**Tutorial**	**Tutorial**	**Tutorial**	**Tutorial**	**Tutorial**
SLO-9	Functions-Types of functions – Comparison of Relations and Functions	Minterms and maxterms with examples	Eulerian cycles	Kruskal's Algorithm - Rooted Tree	Boolean function in canonical form by Truth table method.
SLO-10	Composite of two functions	Principal disjunctive normal form	Hamiltonian Path and Circuits.	Binary Tree and Simple Problems	DNF by Truth table method
SLO-11	Composite of three functions – Simple problems	Principal conjunctive normal form - Problems using Truth Tables	Hamiltonian Path and Circuits – problems using graph – simple problems	Expression of Trees and Simple Problems	CNF by Truth table method – Simple problems
SLO-12	Composite of three functions – Simple problems	Principal conjunctive normal form - Problems using Truth Tables	Simple problems	Expression of Trees and Simple Problems	CNF by Truth table method – Simple problems

Resources			
1	Discrete Mathematics with Graph Theory and Combinatorics by T.Veerajan, McGraw Hill Education(India) Pvt Limited, 2007	2	Dr. A. Singaravelu, Allied Mathematics, 7th edition, A. R. Publications, 2015.

Assessment						
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1	CLA – 2	CLA – 3	CLA – 4*	
		(10 %)	(10 %)	(20 %)	(10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	20	20	15	20	20
2	Understand	20	20	15	20	20
3	Apply	20	20	20	20	20
4	Analyze	20	20	20	20	20
5	Evaluate	10	10	15	10	10
6	Create	10	10	15	10	10
Total (%)		100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai	1	Dr. N.Viswanathan, , Presidency college , Chennai	1	Dr.L.Sivakami, **Assistant Professor, Department of Mathematics & Statistics, FSH, SRMIST, Kattankulathur**
				2	Dr.S.Lakshmipriya, Assistant Professor, **Department of Mathematics & Statistics, FSH, SRMIST, Kattankulathur**

Course Code	UCD24S01J	Course Title	Verbal Ability and Skill Development	Category	S	Skill Enhancement Courses	L	T	P	C
							1	0	2	2

Course Offering Department	Career Guidance	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes													
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	Exposestudentstorightattitudinalandbehavioralaspectsandtobuildthesamethroughactivities																	
CLR-2	Developandnurtureinterpersonalskillsofthestudentsthroughindividualandgroupactivities.																	
CLR-3	Increase efficiency and leadership skills to improve team results.																	
CLR-4	Use the basic mechanics of Grammar.																	
CLO-5	Instill confidence in students and develop skills necessary to face the challenges of competitive exams and placements																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Re-engineer their attitude and understand its influence on behavior	✓	✓	-	-	2	85	75	2	3	2	2	-	1	2	3	-	-
CLO-2	Acquire inter-personal skills and be an effective goal-oriented team player	✓	✓	✓	-	2	85	75	3	3	2	3	-	1	2	1	-	-
CLO-3	Learn the importance of inner management and creativity	✓	✓	✓	✓	3	85	75	3	2	2	3	-	1	2	2	-	-
CLO-4	Understand the correct usage of grammar	✓	✓	✓	✓	3	85	75	3	-	3	-	3	1	1	-	-	-
CLO-5	Help the students succeed in competitive exams and placements	✓	✓	✓	✓	3	85	75	3	-	3	-	3	1	1	-	-	-

Session	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	9	9	9	9	9
SLO-1	Introduction to IKIGAI, IKIGAI – Key concepts	Networkingskills – relationship building, value exchange, active listening, friendliness and positivity, clear communication	Time management skills – ValueofTime, Pomodoro technique.	Basics of Grammar	Sentence Correction
SLO-2	Attitude, Attitude formation and Factors in fluencing Attitude	Negotiationskills – building rapport and problem-solving	WeeklyPlanner,Todolist,Prioritizingwork, Timemanagementactivity	Spotting Errors	Sentence completion (Grammar based)
SLO-3	SWOTAnalysis, individualSWOTAnalysis-SWOTAnalysis activity	EntrepreneurialSkills, Entrepreneurialknowledge, Focus, Investment,Risktolerance,Resilience,Ethics	Creative thinking skills – divergent thinking, Synthesis and collaboration, out-of -the -box thinking	Error spotting based on Parts of Speech	Sentence completion (Vocabulary based)
SLO-4	Presentation skills, Types of presentation, Structure of presentation, Delivery techniques	Creatingbrands– activity(posters,flyers,businesscards)	Creative thinking skillsActivity session	Errors how to avoid in Nouns & Pronouns	Cause and Effect - Introduction
SLO-5	Extempore Practice Session I	Stress Management - CausesofStressandItsImpact	Brainstorming, useofgroups andindividualbrainstorming techniquestopromoteideageneration	Common Errors: Subject - verb Agreement	Cause and Effect – Practise Session
SLO-6	Extempore Practice Session II	HowtoManageStressand distress, Understanding the circle of control, stress busters	Interculturalcommunication –beliefs, customsandattitudesofpeopleindifferent countries(US,UK,Japan,WestAsia,China,Russia), Socialandculturaletiquettes	Vocabulary - Synonyms - Antonyms - Phrasal verbs-	Theme detection – Introduction - Practice session
SLO-7	Interpersonal Skills, Emotional Intelligence	Conflict Management - Conflict in human relations – reasons, Approaches to conflict resolution	Communicationetiquettes, Telephoneetiquettes	One Word Substitution - Homophones - Homonyms	Critical Reasoning and Verbal deduction
SLO-8	ImportanceofTeamWork, TeamBuilding activity	Conflict resolutions – Case studies	Icebreaking, Designingicebreakergames	Words often confused	Types of Critical Reasoning- Tips and Tricks

SLO-9	Leadershipskills, Leadershipskills - based activity	Importance of decision making, Process of decision making, Practical ways of decision making, weighing positives and negatives	Resume writing skills	Idioms and Idiomatic Expressions – Introduction	Word Analogy - Types of Word analogy

Resources			
1	JeffButterfield,SoftSkillsforEveryone, CENGAGE,India,2015	5	ThomasAHarris,Iamok,youareok,Arrow,London,2012
2	Dr.K.Alex,SoftSkills,S. ChandPublishing&Company,India,2014	6	DanielColeman, EmotionalIntelligence,Bloomsbury,India,2016
3	CoveySean,Sevenhabits ofhighlyeffectiveteens,Simon&Schuster,NewYork,2014	7	Norman Lewis, Word Power Made Easy New Revised and Expanded Edition, Goyal publication, 2011
4	CarnegieDale,Howtowinfriendsandinfluencepeople,SimonandSchuster,NewYork,2016	8	Bhatnagar R P, English for Competitive Examinations, Trinity Press, 2016.

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)							
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*	
		(20 %)		(20 %)		(30 %)		(30%)	
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	15	15	20	20	20	20
2	Understand	20	20	15	15	20	20	20	20
3	Apply	15	15	15	15	15	15	20	20
4	Analyse	15	15	15	15	15	15	20	20
5	Evaluate	15	15	20	20	15	15	10	10
6	Create	15	15	20	20	15	15	10	10
Total (%)		100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. P. Chockalingam, Senior Lead Software Engineer, Virtusa Consulting Services Private Ltd, DLF IT Park SEZ, Chennai – 600089 p.chockalingam1986@gmail.com -	1	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidhyapeetham, Coimbatore - 641112 g_saravanaprabu@cb.amrita.edu -	1	Dr.SathishK,HOD,DepartmentofCareerGuidanceCell,FSH,SRMIST hod.dcgc.ktr@srmist.edu.in
				2	Mrs.Deepalakshmi S, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST, deepalas@srmist.edu.in
				3	Dr. Sam Israel S, Assistant Professor, Department of Career Guidance Cell, FSH, SRMIST, samisras@srmist.edu.in

SEMESTER – II

Course Code	ULT24AE2J	Course Title	Tamil - II	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

Course Offering Department	Tamil	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	சங்கஇலக்கியங்கள்வழிதொன்மைஅக, புறவாழ்வியலைஅறியச்செய்தல்																	
CLR-2	தமிழ்ச்சமூகத்தின்அறவியல்குறித்துதெரியச்செய்தல்																	
CLR-3	பக்திஇலக்கியங்கள்போதித்தமனிதமாண்புகளைஉணரச்செய்தல்																	
CLR-4	பண்டைத்தமிழ்ச்சமூகத்தின்தொல்இலக்கியங்கள்வளர்ச்சிபெற்றவரலாற்றைப்புரியச்செய்தல்																	
CLR-5	சிறுகதைகள்சொல்லும்வாழ்வியல்நெறி, மொழியின்நுட்பங்கள்ஆகியவற்றைத்தெரியச்செய்தல்																	

CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	பண்டைத்தமிழ்ச்சமூகத்தின்அக, புறவாழ்வியல்இன்றையசமூகமேம்பாட்டிற்குவழிகாட்டிநிற்பதைஅறிந்துகொள்ளுதல்	✓	✓	-	-	2	75	60	-	3	3	-	-	-	2	-	-	-
CLO-2	தமிழ்ச்சமூகம்அறத்தைவலியுறுத்தியசமூகம்என்பதன்வழிமானுடஅறத்தைத்தெரிந்துகொள்ளுதல்	✓	✓	✓	-	2	80	70	2	-	3	-	-	3	-	-	-	-
CLO-3	பக்திஇலக்கியம்மூலம்இறைத்தந்துவங்களைஅறிந்துமானுடஒற்றுமைமேம்பாட்டைஅறிந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	65	-	3	-	3	-	1	-	-	-	-
CLO-4	தொல்தமிழ்ச்சமூகம்இலக்கியம், அரசியல், அறம், பக்திஆகியவற்றில்தழைத்தோங்கியதைத்தெரிந்துகொள்ளுதல்	✓	✓	✓	✓	2	70	70	3	-	3	-	-	3	-	-	-	-
CLO-5	வாழ்வியலின்நெறிகளைச்சொல்லும்கதைகளைப்படைக்கும்திறனோடுமொழிஆளுமையையும்அறிந்துகொள்ளுதல்	✓	✓	✓	✓	3	80	70	3	-	-	2	-	-	-	3	-	-

Session	CLO – 1	CLO - 2	CLO - 3	CLO - 4	CLO – 5
	12	12	12	12	12
SLO-1	காலந்தோறும்தமிழ்அகத்திணைமரபு - உள்ளடக்கம்	சங்கமருவியகாலம்அறமும்வாழ்வியலும்	பல்லவர்காலஇலக்கியங்கள்	பண்டைக்காலத்தமிழகம்சங்ககாலமக்களின்வாழ்வியல்	தமிழ்ச்சிறுகதையும்தமிழ்ச்சமூகவாழ்வியலும்

SLO-2	எட்டுத்தொகைநூல்களும்பகுப்புமுறையும்	உலகப்பொதுமறை - திருக்குறள்கட்டமைப்பு	பக்தியும்தமிழும் - பக்திஇலக்கியத்தோற்றநிலை	முச்சங்கஅறிமுகமும் வரலாறும்	புதுமைப்பித்தன் - சங்குத்தேவனின்தர்மம்
SLO-3	ஐங்குறுநூறு – 375, 391	திருக்குறள்வான்சிறப்பு (2)	சைவசமயஇலக்கியங்கள் - சைவக்குரவர்நால்வர்	சங்கஇலக்கியப்பாடுபொருளும்வடிவமும்	ந.பிச்சமூர்த்தி – வேப்பமரம் - மரபும்நம்பிக்கைகளும்
SLO-4	குறுந்தொகை – 02, 03	திருக்குறள் – புலவிநுணுக்கம் (132) -	தேவாரம் – திருஞானசம்பந்தர் - 2834 திருநாவுக்கரசர் - 4262	எட்டுத்தொகைநூல்களின்வரலாறும்கட்டமைப்பும்	தமிழருவிமணியன் – ஒற்றைச்சிறகு - உறவின்மேன்மை
SLO-5	அகநானூறுநூல்கட்டமைப்பு	தமிழ்இலக்கியமரபில்நீதிஇலக்கியங்கள்	திருவாசகம்- மாணிக்கவாசகர்ஆனந்தபரவசம் – பாடல் 10	பத்துப்பாட்டுநூல்களின்வரலாறும்வாழ்வியலும்	ஆர். சூடாமணி – மூடநம்பிக்கை.
SLO-6	அகநானூறு -238	நாலடியார்வைகலும் - பாடல்எண் 39	வைணவசமயவளர்ச்சிப்போக்கு	பதினெண்கீழ்க்கணக்கும்தமிழர்அறமரபும்	கிருஷ்ணாடாவின்ஸி – காலாஅருகேவாடா
SLO-7	கலித்தொகை – 11	நீதிஇலக்கியத்தில்மருந்துநூல்கள்	நாலாயிரத்திவ்யப்பிரபந்தம் குலசேகராழ்வார்பாடல்- 678	பதினோருநீதிஇலக்கியங்கள்	மொழிப்பயிற்சிசொற்களைஉருவாக்குதல்
SLO-8	தமிழர்புறமரபு- புறநானூறு- 107	சிறுபஞ்சமூலம் -64	ஆண்டாள்பாடல் – 574. திருமழிசைஆழ்வார்பாடல்	காப்பியஇலக்கணம் - காப்பியங்களின்வகைமை	எழுத்துகளில்இருந்துசொற்களைக்கண்டுபிடித்தல்
SLO-9	புறநானூறு -110, 112	பழமொழிநானூறுஅறிமுகம் – தனித்தன்மைகள்	தமிழில்இஸ்லாமியஇலக்கியங்கள்	ஐம்பெருங்காப்பியங்கள்	படம்பார்த்துக்கதைஎழுதுதல்
SLO-10	பத்துப்பாட்டும்ஆற்றுப்படைநூல்களும்	பழமொழிநானூறு - 184	சீறாப்புராணம் - விடமீட்டப்படலம் -10 பாடல்கள்	தமிழ்ச்சமூகமும்சமயத்தத்துவங்களும்	படம்பார்த்துக்கவிதைஎழுதுதல்
SLO-11	சிறுபாணாற்றுப்படை: 84-115	பண்டைக்காலப்போரும்வாழ்வும் - புறம்	தமிழில்கிறித்தவஇலக்கியங்கள்	பன்னிருதிருமுறை – அறிமுகம், வரலாறு	கற்பனையும்படைப்பும் - தமிழில்வாசகம்
SLO-12	பட்டினப்பாலை: 40-50	களவழிநாற்பது - 40	கிறித்துவின்அருள்வேட்டல் – திரு.வி.க. அலகிலொளி- 5 பாடல்	நாலாயிரத்திவ்வியப்பிரபந்தம் – அறிமுகம், வரலாறு	விளம்பரத்திற்குவாசகம்எழுதுதல்

Resources			
1	கொன்றை, தொகுப்பும்பதிப்பும் - தமிழ்த்துறைஆசிரியர்கள், தமிழ்த்துறை, எஸ்.ஆர்.எம். அறிவியல்மற்றும்தொழில்நுட்பக்கல்விநிறுவனம், காட்டாங்குளத்தூர், 603203, 2023	4	தமிழண்ணல், புதியநோக்கில்தமிழ்இலக்கியவரலாறு, மீனாட்சிபுத்தகநிலையம், மதுரை, **2017**
2	மு. அருணாசலம், தமிழ்இலக்கியவரலாறு, நூற்றாண்டுமுறை (9ஆம்நூ. முதல் 16 வரை), திபார்க்கர், சென்னை, 2005	5	தமிழ்இலக்கியத்தொடரடைவு
3	மதுரைதமிழ்இலக்கியமின்தொகுப்புத்திட்டம்	6	தமிழ்இணையக்கல்விக்கழகம்

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1		CLA – 2		CLA – 3		CLA – 4 *		
		(10 %)		(10 %)		(20 %)		(10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Dr. P.R.Subramanian, Director, Mozhi Trust, Thiruvanmiyur, Chennai – 600 041.	1	Dr. V. Dhanalakshmi, Associate Professor, Subramania Bharathi School of Tamil Language & Literaturel, Pondicherry University, Pondicherry	1	Dr. B.Jaiganesh, Associate Professor & Head, Dept. of Tamil, FSH, SRMIST, KTR.
				2	Dr. R. Ravi, Assistant Professor and Head, Dept. of Tamil, FSH, SRMIST, VDP.
				3	Mr. G. Ganesh, Assistant Professor, Dept. of Tamil, FSH, SRMIST, RMP.
				4	Dr. T.R.Hebzibah beulah Suganthi, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.
				5	Dr. S.Saraswathy, Assistant Professor, Dept. of Tamil, FSH, SRMIST, KTR.

Course Code	ULH24AE2J	Course Title	Hindi - II	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

Course Offering Department	Hindi	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	They get to learn Ancient,Medieval,and Modern poetry																	
CLR-2	To understand the Significance of poems of great poets like Kabir,Tulsidas,Bihari and Dhananand																	
CLR-3	To Enhance and Enrich their knoeledge through poetry																	
CLR-4	Media based understanding for employability																	
CLR-5	Job Oriented writing skills																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn ,Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	To provide a brief Introduction of Hindi poetry(Bhaktikal,Reetikal and Aadhunikkal)	✓	✓	-	-	2	85	75	3	2	3	-	-	2	-	-	-	-
CLO-2	To Discuss the origin and development of various forms of poetry in Hindi	✓	✓	✓	-	2	85	75	3	-	2	-	3	-	3	-	-	-
CLO-3	Focus on Evaluating the social changes through poetry	✓	✓	✓	✓	3	85	75	-	3	-	3	3	2	-	-	-	-
CLO-4	To Examine Transcreation in advertisement	✓	✓	✓	✓	3	85	75	2	-	2	3	-	-	2	-	-	-
CLO-5	To guide the students in the learning of the technical aspect of the Hindi Languge,this would help them in the field administration	✓	✓	✓	✓	3	85	75	-	3	-	3	3	2	-	-	-	-

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	12	12	12	12	12
SLO-1	BHAKTI KALIN KAVITA	RITI KALIN KAVITA	ADHUNIK KAVITA	VIGYAPAN	PATRA LEKHAN&PARIBHASHIK SHABDAVALI

SLO-2	BHAKTIU KALIN KAITA KI AVADHARNA	AVADHARNA EVM SAWROOP	AVADHARNA EVM SAWROOP	AWADHARNA EVM SAROOP	AVADHARNA EVM SAROOP
SLO-3	SWARUP EVM MAHATWA	RITI KAL VIBHAJAN	MAHATVA EVM UDDESHYA	ARTH EVM PARIBHASHA	ARTH EVM PARIBHASHA
SLO-4	BHAKTIKAL KI PRASANGIKTA	MAHATVA EVM UDDESHYA	MATHLI SHARAN GUPT- NAR HO NA NIRASH KARO MAN KO	VIGYAPAN KE PRAKAR	PRAYOJAN EVM PRYOG
SLO-5	DOHE- KABIRDAS	DOHE- BIHARI	KAVI PARICHAYA EVM KAVITA KA VISHLESHAN	VIGYAPAN KI VISHESHTAYEN	PRAKAR EVM MAHATVA
SLO-6	SANT PARICHAY	KAVI PARICHAYA	SURYAKANT TRIPATHI NIRALA- VAR DE VEENAVADINI VAR DE	VIGYAPAN KA MAHATVA	VYAKTIGAT PATRA
SLO-7	DOHE KA VISLESHAN	DOHE KA VISLESHAN	KAVI PARICHAYA EVM VISHLESHAN	VIGYAPAN KI BHASHA	AUPCHARIK PATRA
SLO-8	GURU KA MAHATVA	DOHE- GHANANAND	NAGARJUN-- AKAL AUR USKE BAD	VIGYAPAN AUR ROZGAR	PARIBHASHIK SHABDAVALI
SLO-9	DOHE- TULSHIDAS	SNEH KI SARLTA KA VARNAN	AKAL KA VASHTAVIK CHITRAN	PRINT EVM ELECTRONIC VIGYAPAN	SHABDAVALI KI AVSHYAKTA
SLO-10	DOHE KA VISLESHAN	PREM KA MAHATVA	KATTIS- BADRINARAYAN	VIGYAPAN KI VYAPAKTA	KARYALYIN SHABDAVALI
SLO-11	DAYA KA MAHATVA	GHANANAND KI KAVYA SHAILI KA MAHATVA	SAMBAND VICCHED KI PARICHARCHA	VIGYAPANLEKHAN KI KALA	EK DIN EK SHABD
SLO-12	RAM KI MAHIMA	DHOHA PARICHARCHA	KAVYA PARICHARCHA	UDDESHYA	HINDI SE ANGREJI AUR ANGREJI SE HINDI SHABD

Resources			
1	Edited Book: ““SAMANYA HINDI”, SRIJONLOK PUBLICATION, 2023, New Delhi.	4	BHAKTI ANDOLAN AUR SURDAS KA KAVYA – MANAGER PANDEY
2	KABIR – HAZARI PRASAD DWEDI	5	BIHARI – VISHVNATH PRASAD MISHR
3	SURDAS – RAM CHANDRA SHUKL	6	AADHUNIK VIGYAPAN AUR JANSAMPARK – TARESH BHATIA

Assessment										
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*		
		(10 %)		(10 %)		(20 %)		(10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
	Total (%)	100	100	100	100	100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
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Course Code	ULF24AE2J	Course Title	French - II	Category	A	Ability Enhancement Course	L	T	P	C
							2	0	2	3

Course Offering Department	French	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	Strengthen the language of the students both in oral and written	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Express their sentiments, emotions, and opinions, reacting to information, situations																	
CLR-3	Make them learn the basic rules of French Grammar.																	
CLR-4	Develop strategies of comprehension of texts of different origin																	
CLR-5	Enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativ Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasonin Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	To acquire knowledge about French language	✓	✓	-	-	2	85	75	3	2	3	-	-	2	-	-	-	-
CLO-2	To strengthen the knowledge on concept, culture, civilization, and translation of French	✓	✓	✓	-	2	85	75	3	-	2	-	3	-	3	-	-	-
CLO-3	To develop content using the features in French language	✓	✓	✓	✓	3	85	75	-	3	-	3	3	2	-	-	-	-
CLO-4	To interpret the French language into other language	✓	✓	✓	✓	3	85	75	2	-	2	3	-	-	2	-	-	-
CLO-5	To improve the communication, intercultural elements in French language	✓	✓	✓	✓	3	85	75	-	3	-	3	3	2	-	-	-	-

Session	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	12	12	12	12	12
SLO-1	Temps libre	Le pronom indéfini on	Vendre	Il faut	Les gallicismes
SLO-2	Les loisirs	Les adjectifs interrogatifs	Acheter	Le verbe devoir	Les pronoms personnels COI
SLO-3	Les moments de la journée	Les prépositions avec les noms géographiques	Les aliments	Le verbe pouvoir	Le pronom Y
SLO-4	Les matières scolaires	Les verbes prendre et sortir	Les emballages	Le verbe vouloir	Des pronoms compléments

SLO-5	Les activités quotidiennes, Les quotidiennes	Les sons	Les quantités	Demander et dire le prix	Les nombres ordinaux
SLO-6	Le temps, L'heure	Parler de ses gouts	Les commerces	Faire des achats	Les verbes écrire et voir
SLO-7	La fréquence	Parler de ses préférences	Les commerçants	Les activités	Le E caduc ou instable
SLO-8	Les sons [u], Les sons [y]	Parler de sa routine	L'impératif	Les activités	Présenter ses vœux
SLO-9	L'heure, Quelle heure est-il ?	A la recherche d'un cadeau	Les articles partitifs	Mots et expressions	Présenter ses félicitations
SLO-10	Les pronoms personnels COD	Temps libre	Très ou beaucoup (de)	Communication	Répondre à une invitation
SLO-11	Les pronominaux, Se promener, se coucher etc…,	Mots et expressions	Le pronom en (la quantité)	Les sorties	Écrire un message amical
SLO-12	Les verbes du premier groupe, Parler, Demander, Poser	Grammaire– Communication	La phrase négative (2	Les fêtes	Parler au téléphone

Resources			
1	''La Nouvelle Génération-AI'' Méthode de français, Marie-Noëlle COCTON, P. DAUDA, L. GIACHINO, C. BARACCO, Les éditions Didier, Paris, 2018.	2	https://www.elearningfrench.com/learn-french-grammar-online-free.html
3	Cahier d'activités avec deux discs compacts.	4	https://www.lawlessfrench.com/grammar
5	https://www.fluentu.com/blog/french/french-grammar	6	https://blog.gymglish.com/2022/12/15/basic-french-grammar

Assessment										
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*		
		(10 %)		(10 %)		(20 %)		(10%)		
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)
1	Remember	15	15	15	15	10	10	10	10	15
2	Understand	15	15	15	15	10	10	10	10	15
3	Apply	20	25	25	20	25	25	25	25	25
4	Analyze	20	25	25	20	25	25	25	25	25
5	Evaluate	15	10	10	15	15	15	15	15	10
6	Create	15	10	10	15	15	15	15	15	10
Total (%)		100	100	100	100	100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Kavaskar Danasegarane, Language Specialist, Process Expert Maersk Global Service Center Pvt. Ltd Mailkavas18@gmail.com	1	Dr. C.Thirumurugan ,Professor, Department of French, Pondicherry University drcthirumurugan@gmail.com	1	Mr. Kumaravel K. Assistant Professor & Head, SRMIST,KTR., hod.french.ktr@srmist.edu.in
23	Mr. Shrivathsan S, Journalist, Senior Sports Reporter/Sub-Editor, Times of India, Chennai shrivathsangilramhanga@gmail.com			2	Miss. Abigail A, Assistant Professor , SRMIST,VDP abigaila@srmist.edu.in
				3	Mrs.M.Mahalakshmi, Assistant Professor , SRMIST,RMP mahalakm2@srmist.edu.in

Course Code	USA24201J	Course Title	Data Structures and Algorithms	Category	C	Discipline Core Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes									
CLR-1	Utilize the different data types; Utilize searching and sorting algorithms	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Utilize linked list in developing applications																	
CLR-3	Utilize stack and queues in processing data for real-time applications																	
CLR-4	Utilize tree data storage structure for real-time applications																	
CLR-5	Utilize algorithms to find shortest data search in graphs for real-time application development																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Identify linear and non-linear data structures. Create algorithms for searching and sorting	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Create the different types of linked lists and evaluate its operations	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Construct stack and queue data structures and evaluate its operations	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Create tree data structures and evaluate its types and operations	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Create graph data structure, evaluate its operations, implement algorithms to identify shortest path	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Introduction to Data Structures	Stack & Queues	Trees	Sorting & Searching	Graph
	18	18	18	18	18
SLO-1	Introduction to theory of data structures Data representation	Introduction to stack Representation of stack through array	Tree Traversals–In order, preorder Tree Traversals-Post order	Introduction to sorting Different types of sorting	Graph Terminology Representation of graph–Arrays
SLO-2	Abstract Data type Classification of data types	Representation of stack through linked List Operations on stack	Binary Search Tree Threaded Binary Search Tree	Bubble sort Example	Representation of graph–Linked list Graph Traversal–BFS

SLO-3	Asymptotic Notation Algorithm Analysis, Recursion	Disadvantages of Stack, Polish notations Applications–Evaluation of Expression, Tower of Hanoi, Infix to Postfix Expression	Binary Search Tree: Construction Binary Search Tree: Insertion, Searching	Insertion Sort Quick sort Example	Example Graph Traversal–DFS, Topological Sorting
SLO-4-6	Lab 1:Recursion	Lab 4:Implementation of stack and its Applications	Lab 7: Implement all the three type of Tree Traversals	Lab 10:Implementation of Bubble and Insertion sort	Lab 13:Implementation of Graph using Array
SLO-7	Introduction to Data structures Data Structures and its uses	Queue, Representation of Queue using Arrays and Linked list	Applications of trees Applications of BST	Selection sortExample	Shortest Path Algorithm-Introduction Shortest Path Algorithm: Dijkstra
SLO-8	Linear and Non-Linear Data Structures, Operations on datastructure	Operations on Queue, Circular Queue	Expression trees, Example	Merge sort, Example	Applications of Graph,
SLO-9	Array types Array operations, Applications of arrays Dynamic memory allocation	Double ended Queue Priority Queue, Reversing a Queue using another queue, Applications of Queue	AVL Tree AVL Tree Rotations, Applications of AVL tree	Radix sort, Heap Sort, Example, Comparison of sorts	Minimum spanning tree–Prims Minimum Spanning Tree–Kruskals
SLO-10-12	Lab 2:Arrays	Lab 5:Queue implementation using array and pointers	Lab 8:Implementation of BST Heap Data Structure	Lab 11:Implementation of Quick sort and merge sort	Lab 14:Implementation of shortest path algorithm
SLO-13	Introduction to lists Linked list operations	Introduction to non-linear data structures TreeADT and Terminologies	Minimum Heap Construction Example	Introduction to searching , Linear search Binary search	Algorithm Design And Analysis Greedy Algorithms
SLO-14	Types of Linked Lists Linked list vs. Arrays	Tree Terminologies Tree Representation	Minimum Heap Deletion Construction Example	Comparison of different search Define Hashing, Hash functions	Back tracking Example
SLO-15	Application of linked list, Performance Analysis and Measurement of algorithm Efficiency of algorithm, Time complexity and space complexity	Tree Types and Operations Binary Tree Representation, Properties of binary tree	Maximum Heap Construction Maximum Heap Deletion Construction Applications of Heaps and AVLtrees	Hashing: Collision avoidance Hashing: Separate chaining, Open addressing, Advantages of Hashing	Divide And Conquer Example
SLO-16-18	Lab 3: Implementation of Linked List	Lab 6:Implementation of binary tree using Arrays	Lab 9:Implementation of Min and Max Heap	Lab 12:Linear search and Binary search	Lab 15:Implementation of minimum spanning tree

Resources			
1	SeymourLipschutz,(2014),“Data Structures with C”,McGraw Hill Education,Special Indian Edition	4	SRDGroup,(2013),“Data structures using C”,McGrawHill,2ndEdition,
2	R.F.Gilberg,B.A.Forouzan,(2005),“Data Structures”,ThomsonIndi,2ndEdition,	5	A.V.Aho,J.EHopcroft,J.D.Ullman,(2003),“Data structures and Algorithms”,1stEdition,Pearson Education
3	MarkAllenWeiss,“Data Structures and Algorithm Analysis in C”,2nd Edition,Pearson Education	6	ReemaThareja,(2011),“Data Structures Using C”,1stEdition,Oxford Higher Education

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	20	20	20	20	20	20
2	Understand	20	20	20	20	20	20	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	10	10	10	10	10	10
6	Create	10	10	10	10	10	10	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan,Professor,University of Madras, Chennai	1	Dr.R.Aruna Rani, Assistant Professor, SRMIST, KTR Campus

Course Code	UCA24202J	Course Title	Object Oriented Programming	Category	C	Discipline	L	T	P	C
						Core Course	3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
CLR-1	Introduction to object oriented programming.	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Utilize method overloading and operator overloading for real-time application development programs																	
CLR-3	Utilize inline, friend and virtual functions and create application development programs																	
CLR-4	Utilize exceptional handling and collections for real-time object oriented programming applications																	
CLR-5	Create programs using object oriented approach and design methodologies for real-time application development																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Understanding the object oriented programming	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Construct programs using method overloading and operator overloading	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Create programs using inline, friend and virtual functions, construct programs using standard templates	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Construct programs using exceptional handling and collections	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Construct programs using object oriented concepts	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Session	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Introduction to OOPs Concept	Constructor & Overloading	Inheritance &Abstract Classes	Working with Files	Templates & Exception Handling
	18	18	18	18	18
SLO-1	Comparison of Procedural and Object Oriented Programming List of OOPS languages and its features	Constructor Types: Default and Parameterized constructor Example Programs	Inheritance and its types Inheritance: Single	Introduction to Files Classes For File Stream Operations	Templates : Introduction Types of templates
SLO-2	Features: Classes, Objects, Inheritance, Polymorphism, Encapsulation Data Hiding, Message Passing, Reusability	Constructor Types: Copy and Static, Private. Example Programs	Inheritance: Multiple, Example program Inheritance: Multilevel	Types of files, Opening and Closing a File, Example Program Detecting End Of File	Class Templates Example for class templates Function templates

SLO-3	I/O Operations, Data Types Variables, Constants and Type Conversion, Operators, Special operators	Destructor Static Data members, Static member functions, Example program	Example program Visibility of access specifier	Example program Read and write functions- character and string	Introduction to STL – Containers and Iterators Simple example for STL, Example program
SLO-4-6	Lab 1: I/O operations and operators	Lab 4: Parameterized Constructor and Constructor Overloading	Lab 7: Inheritance	Lab 10: Simple file programs	Lab13 :Templates
SLO-7	Control Structures Examples of Control Structures	Overloading Concept in OOP Overloading types	Inheritance : Hierarchical Example program	File Open Modes Example program	Exceptional Handling: Types of exceptional handlingExceptional Handling :Try and Catch, Example program
SLO-8	Functions and types Function declaration and definition	Function Overloading: Different parameter with same data type Example Program	Inheritance : Hybrid Example program	File Pointer Manipulations Example Program	Exceptional Handling : Standard exceptions Example program
SLO-9	Passing arguments, returning values, default arguments, Constant arguments Call by value , Call by reference, Return by reference, Inline Functions	Function Overloading: Different parameter with different argument types, Example Program Function Overloading: Different parameter with different return values, Example Program	Constructors and destructors in inheritance, Example Program Constructors and types of inheritance, Example program	Sequential Input and Output Operations Functions to handle file pointer, Example Program	Exceptional Handling: Multilevel exceptional throw and throws, Example program
SLO-10-12	Lab 2: Control structures and Functions	Lab 5: Function Overloading	Lab 8 : Multiple, Multilevel Inheritance	Lab 11: Working with files	Lab 14: Multilevel exceptional programs
SLO-13	Classes and Objects Access specifier	Operator Overloading Concept, Types of operator overloading Operator Overloading: Unary Operators, Example program	Virtual Base Classes Example Program	Reading a class object, Example Program Random Access –Updating a File	Exceptional Handling: finally User defined exceptions
SLO-14	Visibility of access specifier Example program Friend Function Example program	Operator Overloading: binary Operators Example program	Abstract Classes, Example Program Virtual Functions, Example Program	Example program Error Handling in File Operations	Programs for user defined exceptions, Example program Exception Handling class, Example program
SLO-15	Inline functions Example program Constructor, Destructor Example program	Operator Overloading: Assignment Operator Example program	this pointer Example Program	Example program Command Line Arguments, Example program	User defined exceptional class Example Programs using CPP
SLO-16-18	Lab 3: Classes and Objects	Lab 6: Operator Overloading	Lab 9 : Abstract classes and Virtual Functions	Lab 12: command line arguments program	Lab 15: User defined Exceptions and simple CPP application.

Resources			
1	E Balagurusamy, Object Oriented Programming in C++, 7th ed., Tata McGraw-Hill , 2017	3	Reema Thareja, Object Oriented Programming with C++, 1st ed., Oxford University Press, 2015
2	R S Salaria, Mastering Object Oriented Systems Development Programming in C++", 6th ed., Khanna Publishing,2016	4	Robert Lafore, Object-Oriented Programming in C++, 4th ed., SAMS Publishing, 2008

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4* (10%)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	20	20	20	20	20	20
2	Understand	20	20	20	20	20	20	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	10	10	10	10	10	10
6	Create	10	10	10	10	10	10	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Dr.R.Thilagavathy, Assistant Professor, SRMIST, KTR Campus

Course Code	UMS24202T	Course Title	Mathematical Foundation	Category	C	Discipline Core Course	L	T	P	C
							4	0	0	4

Course Offering Department	Mathematics and Statistics	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programmme Learning Outcomes									
CLR-1	To apply the basic concepts and theorems of Matrices	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	To learn the concepts of polynomial equations, reciprocal equations and approximation of roots.																	
CLR-3	To learn the basic concepts of differentiation, successive differentiation and partial differentiation																	
CLR-4	To learn the basic concepts of integration and to apply Bernoulli's formula and reduction formula.																	
CLR-5	To understand how a function is transformed by Laplace and inverse Laplace methods and how they are related.																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Gaining knowledge in basic concepts of matrix method.	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Gaining knowledge in the concepts of polynomial equations and reciprocal equations and applying Horner's and Newton's methods for finding roots	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Understanding the concepts of differentiation and to solve the problems of Radius of curvature and Euler's theorem	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Understanding the concepts of integration and to evaluate reduction formula.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Getting the knowledge of Laplace and Inverse Laplace transformation and their application.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Session	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	Matrices	Algebraic Equations	Differentiation	Integration	Laplace Transforms
	12	12	12	12	12
SLO-1	Definition and types of matrix - Examples of types of Matrix	Introduction to algebraic equations	Introduction to Differentiation	Introduction to integration - Basic problems on integration	Introduction to Laplace Transforms- Basic Properties
SLO-2	Symmetric matrix - Skew- symmetric matrix	Types of algebraic equations	Solving basic problems – more examples	Integration of polynomial functions and Irrational Functions	Problems on Laplace Transforms

SLO-3	Hermitian matrix - Skew-Hermitian matrix	Relation between roots and coefficients of equation	Maxima- Minima of functions of single variable	Integration by the method of partial fractions Type I, Type II, Type III	Problems based on Shifting property
SLO-4	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial
SLO-5	Orthogonal matrix	Problems on irrational roots	Problems based on Maxima-Minima of functions of single variable	Bernoulli's formula	Solving problems of type $L\left[e^{at} f(t)\right]$
SLO-6	Unitary matrix	Complex roots	Introduction to curvature	Simple Problems	Problems based on derivative method
SLO-7	Eigen values of a matrix	Reciprocal equations-Definition	Radius of Curvature	Reduction formula for $\int \sin^n x dx$	Solving problems of type $L[tf(t)]$
SLO-8	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial
SLO-9	Eigen values and eigen vectors of a matrix	Solving Reciprocal equation of degree four with like and unlike signs for its coefficients-Type I, Type II , Type III , Type IV	Problems based on radius of curvature	Reduction formula for $\int \cos^n x dx$	Solving problems of type $L\left[t^n f(t)\right]$ and type $L\left[e^{at} tf(t)\right]$
SLO-10	Cayley Hamilton theorem - Problems	Newton-Raphson method – Problems	Partial differentiation-Introduction	Reduction formula for $\int_0^{\frac{\pi}{2}} \sin^n x dx$	Solving problems of type $L\left[\frac{f(t)}{t}\right]$
SLO-11	Cramer's rule	Horner's Methods	Euler's theorem	Reduction formula for $\int_0^{\frac{\pi}{2}} \cos^n x dx$	Basic problems on Inverse Laplace Transforms
SLO-12	Problems based on Cramer's rule	Problems based on Horner's Methods	Problems based on Euler's Theorem	Simple problems	Finding inverse Laplace transforms by the method of partial fractions – problems based on that concepts.

Resources			
1	Dr.A.Singaravelu, Allied Mathematics, 7th edition, A.R.S.Publicatiions, 2015	2	P.R.Vittal, Margham Publications, Latest edition,2002

Assessment

	Bloom`s Level of Thinking	Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1	CLA – 2	CLA – 3	CLA – 4*	
		(10 %)	(10 %)	(20 %)	(10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	20	20	20	20	20
2	Understand	20	20	20	20	20
3	Apply	20	20	20	20	20
4	Analyse	20	20	20	20	20
5	Evaluate	10	10	10	10	10
6	Create	10	10	10	10	10
	Total (%)	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai	1	Dr. N.Viswanathan, Presidency college , Chennai	1	Dr.S.Poongodisathiya, SRM IST, KTR Campus, poongods@srmist.edu.in
				2	Dr.S.Saravanakumar, SRM IST, KTR Campus, saravans14@srmist.edu.in

Course Code	UCD24V01T	Course Title	Essentials of Artificial Intelligence	Category	V	Value Added Course	L	T	P	C
							1	0	0	1

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Programme Learning Outcomes										
CLR-1	Study the basics of designing intelligent agents that can solve general purpose problems	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Discover appropriate AI methods to solve a given problem																	
CLR-3	Perform intellectual task as decision making, problem solving, perception, understanding																	
CLR-4	Formalize a given problem using different AI methods																	
CLR-5	Provides adaptive learning																	

CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Demonstrate fundamental understanding of the history of artificial intelligence and its foundations	✓	✓	-	-	2	85	75	3	-	-	1	2	1	-	-	-	1
CLO-2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning	✓	✓	✓	-	2	85	75	2	-	1	-	2	2	-	1	-	1
CLO-3	Identify systems with Artificial Intelligence. evaluation of different algorithms on a problem formalization	✓	✓	✓	✓	3	85	75	2	3	2	-	2	1	-	1	-	2
CLO-4	Use classical Artificial Intelligence techniques, such as search algorithms	✓	✓	✓	✓	3	85	75	3	-	2	-	2	2	-	2	-	-
CLO-5	Ability to apply Artificial Intelligence techniques for problem solving.	✓	✓	✓	✓	3	85	75	2	2	-	-	2	-	-	-	-	-

Session	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
	Introduction to Artificial Intelligence	Logical Reasoning and First order logic	Unification and State Space Search	Planning Graphs	Probability Theory and Temporal Models
	3	3	3	3	3
SLO-1	Introduction to Artificial Intelligence, History of Artificial Intelligence- AI models,	Logical Reasoning-Introduction-Knowledge Representation	Unification and Conditions, Unification algorithm	Partial-order planning, planning graphs	Probability Theory, Uncertain Knowledge, Axioms of probability.

SLO-2	Problem Solving with Artificial Intelligence- Problem Solving Process	Logical Agents, Knowledge based Agents, Syntax of First order logic, Basic elements of First order logic	Planning: designing programs to search for data or solutions to problem.	Uses of planning graph, Planning and acting in the real world	Bayes Theorem, Bayes' Rules & uses, Bayesian networks, Types of Bayesian Network
SLO-3	Problem Types, Characteristics and Representation-Agents- Examples of Agents, Types of agents	Forward chaining and Backward Chaining- Properties Examples	State-space search, Problems to solve: Water Jug Problem, State representation: Initial, operator, goal state	Forward march, Backward march and Limited resources	Temporal models, Hidden Markov models, HMM components

Resources			
1	Russel.SandNorvig.P, (2003), "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education	2	S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education

Assessment					
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)			
		CLA – 1 (20%)	CLA – 2 (20%)	CLA – 3 (40%)	CLA – 4* (20%)
		Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	15	15	10	10
2	Understand	15	15	10	10
3	Apply	20	25	25	25
4	Analyse	20	25	25	25
5	Evaluate	15	10	15	15
6	Create	15	10	15	15
Total (%)		100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 VentureDrive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor and Head, Department of Computer Science, University of Madras, Guindy Campus,Chennai-600025	1	Dr.S.Belina V J Sara, Assistant Professor, SRMIST, KTR Campus

Course Code	UCD24S02L	Course Title	Quantitative Aptitude and Logical Reasoning	Category	S	Skill Enhancement Course	L	T	P	C
							0	0	2	1

Course Offering Department	Career Guidance	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1	Illustrate the application of different principles in solving mathematical problems
CLR-2	Foster students' curiosity and understanding of concepts related to profit/loss, interest computation, and averages
CLR-3	Analyze fundamental mathematical concepts concerning permutation and combination, as well as time and work, with a critical perspective
CLR-4	Equip students with the abilities essential for generating and comprehending data, focusing on topics such as cubes, dices and blood relations
CLR-5	Empower students to grasp the fundamentals of reasoning

Outcomes (CLO)	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn ,Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Grasp, evaluate, and tackle problems involving numbers and percentages	✓	✓	-	-	2	85	75	3	1	3	-	2	2	-	-	-	-
CLO-2	Develop, solve, interpret, and apply fundamental mathematical models relevant to everyday situations	✓	✓	✓	-	2	85	75	3	1	3	-	2	2	-	-	-	-
CLO-3	Realize the principles of permutation and combination, probability, time and work, and adopt simplified and innovative approaches to problem- solving	✓	✓	✓	✓	3	85	75	3	1	3	-	2	2	-	-	-	-
CLO-4	Comprehend the concepts of data interpretation, data sufficiency, coding and decoding	✓	✓	✓	✓	3	85	75		1	3	-	2	2	-	-	-	-
CLO-5	Solve logical puzzles and reasoning challenges	✓	✓	✓	✓	3	85	75		1	3	-	2	2	-	-	-	-

Session	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	6	6	6	6	6
SLO-1	Classification of numbers and Test of divisibility	Profit and Loss	Permutation and Combination	Cubes and Dice	Direction Sense

SLO-2	Unit digit and Trailed zeroes	Ratio and Proportions	Problems on Probability	Data Interpretation	Number Series and Word Series
SLO-3	Problems on HCFand LCM	Simple Interest and Compound Interest	Time and work - Men and Work	Data sufficiency	Odd man out Missing Number and Wrong Number
SLO-4	Problems on Partnership	Word problems on Linear and Simultaneous Equations	Time and Work - Pipes and Cisterns	Seating Arrangements – Linear and Circular	Puzzles - Concepts & Problems Syllogisms - Concepts & Problems
SLO-5	Problems on Percentage	Problems on Averages	Time, Speed and Distance - Problems on Trains	Problems on Blood Relations	Problems on Clocks
SLO-6	Percentage - Increasing & Decreasing functions	Mixtures and Alligations	Time, Speed and Distance - Boats & Streams	Coding – Decoding	Problems on Calendars

Resources			
1	Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill, 5th Edition	4	Edgar Thrope, Test of Reasoning for Competitive Examinations, Tata McGraw Hill, 6th Edition
2	Dr. Agarwal. R. S, Quantitative Aptitude for Competitive Examinations, S. Chand and Company Limited, 2018 Edition	5	Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for competitive examinations, Pearson, 3rd Edition
3	Archana Ram, Place Mentor: Tests of Aptitude for Placement Readiness, Oxford University Press, Oxford, 2018	6	P A Anand, Quantitative Aptitude for competitive examinations, Wiley publications, e book, 2019

Assessment					
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)			
		CLA – 1	CLA – 2	CLA – 3	CLA – 4*
		(20 %)	(20 %)	(30 %)	(30%)
		Practice (%)	Practice (%)	Practice (%)	Practice (%)
1	Remember	20	10	20	10
2	Understand	20	10	20	10
3	Apply	20	20	20	20
4	Analyze	20	20	20	20
5	Evaluate	10	20	10	20
6	Create	10	20	10	20
Total (%)		100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations	✓	Clarification/Pauses	✓	Good Health & Well Being	
Presentation Tools	✓	Group Discussion		Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	
		Debate			
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. P. Chockalingam, Senior Lead Software Engineer, Virtusa Consulting Services Private Ltd, DLF IT Park SEZ, Chennai – 600089 p.chockalingam1986@gmail.com	1	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidhyapeetham, Coimbatore - 641112 g_saravanaprabu@cb.amrita.edu	1	Dr.SathishK,HOD,DepartmentofCareerGuidanceCell,FSH,SRMIST hod.dcgc.ktr@srmist.edu.in
				2	Dr.AarthiS,AssistantProfessor,DepartmentofCareerGuidanceCell,FSH,SRMIST aarthis4@srmist.edu.in

Course Code	UNS24Y01L UNC24Y01L UNO24Y01L UYG24Y01L	Course Title	NSS/NCC/NSO/YOGA	Category	Y	Mandatory Course	L	T	P	C
							0	0	0	0

Course Offering Department	NSS	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1	Understand themselves in relation to their community
CLR-2	Develop among themselves a sense of social and civic responsibility
CLR-3	Utilize their knowledge in finding practical solution to individual and community problems
CLR-4	Develop competence required for group-living and sharing of responsibilities
CLR-5	Acquire leadership qualities and democratic attitude

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Programme Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning,	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community	EntreprenuerialRiTaking	PSO 1	PSO 2
CLO-1	realize themselves in relation to their community	✓	✓	-		2	85	75	3	-	-	1		3	3	2		
CLO-2	Develop among themselves a sense of social and civic responsibility	✓	✓	✓		2	85	75	3	2	1	2		3	3	1		
CLO-3	find practical solution to individual and community problems	✓	✓	✓	✓	3	85	75	3	1	3	1		3	3	1		
CLO-4	Develop competence required for group-living and sharing of responsibilities	✓	✓	✓	✓	3	85	75	3	3	2	3		3	3	2		
CLO-5	develop leadership qualities and democratic attitude	✓	✓	✓	✓	3	85	75	3	3	2	3		3	3	3		

Assessment is Fully Internal

Assessment					
Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)			
		CLA – 1 *	CLA – 2 *	CLA – 3 *	CLA – 4 *
		(20%)	(30%)	(30%)	(20 %)
		Practice (%)	Practice (%)	Practice (%)	Practice (%)
1	Remember	20	20	20	20
2	Understand	20	20	20	20
3	Apply	40	40	40	40
4	Analyze	20	20	20	20
5	Evaluate				
6	Create				
Total (%)		100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses		Good Health & Well Being	✓
Presentation Tools		Group Discussion	✓	Quality Education	
Learning Management System		Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming			

***CLA s are evaluated based on (i) participation in awareness programmes, (ii) participation in outreach programme, (iii) Community Services (iv) Camps (National, State, Regional)**

Resources	
1.	NSS Manual (Revised), Government of India

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr Samuel Chellaiya C Regional Director, NSS Government of India	1	State Officer, NSS Tamil Nadu NSS	1	Dr Prakash V, NSS Coordinator, SRMIST, AP, department of Economics, FSH, SRMIST Prakashv2@srmist.edu.in
				2	Dr Yogalakshmi, NSS Programme Officer, FSH, SRMIST.

SEMESTER - III

Course Code	UCA24301J	Course Title	Programming using Java	Category	C	Discipline Core Course	L	T	P	C
							3	0	3	4

Course Offering Department	Compueter Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
CLR-1	An overview of Java and Buzz words	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Understand the object oriented features in Java	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-3	Create and understand the Java program structure																	
CLR-4	Understand the Java packages and Interfaces																	
CLR-5	Use the multithreading programming scenario																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Understand the difference between C++ and Java	✓	✓	-	-	*2*	*85*	*75*	*3*	*1*	*2*	-	*3*	*2*	-	*1*	*2*	*1*
CLO-2	Develop Java program using JVM	✓	✓	✓	-	*2*	*85*	*75*	*3*	*1*	*3*	-	*3*	*3*	-	*1*	*2*	*1*
CLO-3	Use the various kinds of packages and interfaces	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*2*	*3*	-	*3*	*2*	-	*2*	*2*	*1*
CLO-4	Apply the Exception handling methods in Java program.	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	-	*3*	*2*	-	*2*	*3*	*3*
CLO-5	Apply AWT controls I/O streams application programming	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	-	*3*	*2*	-	*3*	*3*	*3*

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	OOPs Concepts	Inheritance And Overloading	Packages and Interfaces	Threads	Event Handling And AWT Controls
	18	18	18	18	18
SLO-1	Basic concepts in OOP.: Major principles - encapsulation, Abstraction, inheritance, polymorphism. Benefits of OOP. Applications of OOP	Constructors- Characteristics of constructors Types of Constructors -Using this Keyword	Method Overriding Dynamic method dispatch - Abstract keyword	Introduction to Java Thread model- Creating a Thread by Extending Thread Class Creating a Thread by implementing Runnable Interface	Introduction to Event Handling - Understanding Action Event & Item Event Understanding Key Event & Mouse Event
SLO-2	The Genesis of Java How java changed the internet- Java's magic: Byte Code, Introduction to Java Buzzword-Understanding Java Buzzwords	Introduction to Garbage Collection, Using Finalize () method Overloading methods	Abstract class Working with Abstract class and Method	Thread Class -Creating multiple threads Assigning Thread priorities	Text Event, Window Event, Component Event- Introduction to Event Listener Interfaces Working with Action Listener &, Adjustment Listener
SLO-3	Understanding Encapsulation, Polymorphism, Inheritance,Introduction to Lexical Issues of Java ,Understanding Whitespaces, Identifiers, Literals Comments, Separators, Keywords	Overloading constructors Using objects as parameters- Argument Passing Returning Objects Recursion,Introducing Access Control	Dynamic Binding Using final with inheritance	Applying Synchronization- Inter-thread communication Introduction to Legacy Calsses	Working with Container Listener Working with Key Listener & Mouse Listener Item Listener, Component Listener
SLO-4,5,6	Lab1: Basic Java Programs	Lab 4: Classes and Objects	Lab7: Inheritance, Method Overriding, Abstract classes and methods	Lab10: Multithreading	Lab 13: Event Handling
SLO-7	Data types - byte, short, int, long, float, double, chars, Boolean Variable- Declaring a variable, dynamic initialization of variables, Scope and lifetime of variables	Static variables and methods, Final variables and methods Working with Nested Class	Introduction to Package, Creating a Package	Vector class, Stack class	Introduction AWT Controls Working with Label controls, Working with Buttons controls,

SLO-8	Introduction to Operators, Working with Arithmetic, Relational, Logical, Bitwise, Conditional, Assignment operators Array- Initialization of Arrays, Types of Arrays	Inner Class, String Class String array	Understanding Access Protection- Importing packages Introduction to Interfaces	Introduction to Legacy Interfaces Understanding Enumeration Interface Introduction to Utility classes	Working with Check Boxes Working with Check Box Group controls Working with Choice controls controls
SLO-9	Introduction to Control Statements IF, IF the else statements Selection Statements, All forms of if & Switch	String Handling Methods	Defining an interface How Interfaces are extended	Working with String Tokenizer	Working with Lists controls Working with Text Field controls Introduction to Layout Manager
SLO-10,11,12	Lab 2: Operators	Lab 5: Overloading Methods and Constructors	Lab 8: Packages and Interfaces	Lab11: Legacy Classes and Interfaces	Lab 14: AWT Controls
SLO-13	Iterative Statements, Working with while, do-while, for, for each statements	Command Line arguments, finalize() method	Implementing Interfaces Introduction to Exception handling	Introduction Working with Date class Introduction Working with Gregorian Calendar	Flow Layout Border Layout
SLO-14	Jump Statements- break statements, continue and return statements Introducing classes- Class fundamentals	Single line arguments, Double line arguments Inheritance Basics	try and catch multiple catch clauses ,Finally ,Throw and throws	Working with Date class- Working with Calendar Working with Gregorian Calendar- Working with Random Class	Grid Layout Byte Streams classes
SLO-15	Declaring Objects- Assigning object Reference variables- Introducing method	Types of Inheritance: Single, Multilevel, Hierarchical Inheritance using Super keyword	Exception Types Built-in Exceptions ,Creating user defined Exceptions	Working with Scanner Class utility classes	Introduction to I/O Streams Character Streams classes
SLO-16,17,18	Lab 3: Arrays, Control Statements	Lab 6: String Class, Command Line Arguments	Lab 9: Exception Handling	Lab 12: Utility Classes	Lab 15: Layout Managers, Byte and Character Streams

Resources			
1	Herbert Schildt (2007), Java: The Complete Reference, Tata McGraw-Hill, Seventh Edition, New Delhi.	3	Horstmann S., Gray Cornell (2001), Core Java 2 Volume In, Fundamentals, Addition Wesley, New York.
2	Amold and Gosling, J. (2000), The Java Programming Language, Addition Wesley, 2nd Edition, New Delhi.	4	Art Gittleman (2002), Ultimate Java Programming, Wiley Publications, New York.

Assessment										
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4* (10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Dr.S.P.Angelin Claret

Course Code	USA24302J	Course Title	Database Management System	Category	C	Discipline Core Course	L	T	P	C
							3	0	3	4

Course Offering Department	Department of Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Understand the fundamentals of Database Management Systems and Its architecture	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning,	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	To impart in-depth knowledge of database design process through ER Model and Relational Model																	
CLR-3	Understand the using Structure Query Language (SQL) and PL/SQL																	
CLR-4	Basic knowledge of Improvement of the database design using normalization criteria and optimize queries																	
CLR-5	Basic knowledge of the practical problems of concurrency control and gain knowledge about failures and recover																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Have a thorough Understanding of the Database Systems	✓	✓	-	-	*2*	*85*	*75*	*3*	*2*	*2*	*1*	*3*	*2*	*-*	*2*	*1*	*1*
CLO-2	Realize the concepts of ER Model and Relational Model	✓	✓	✓	-	*2*	*85*	*75*	*3*	*2*	*2*	*1*	*3*	*3*	*-*	*1*	*1*	*1*
CLO-3	Create real time applications of SQL and PL/SQL	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*2*	*2*	*1*	*3*	*2*	*-*	*2*	*1*	*1*
CLO-4	Design and implementation knowledge of a Normalized Database	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*2*	*2*	*1*	*3*	*3*	*-*	*1*	*3*	*3*
CLO-5	Design and implementation knowledge of Concurrency Control	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*2*	*2*	*1*	*3*	*2*	*-*	*3*	*3*	*3*

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Fundamentals of DBMS	**E-R Model**	**Working With SQL**	**Basics of PL/SQL**	**Concurrency and Security**
	18	**18**	**18**	**18**	**18**
SLO-1	What is a DBMS	Introduction to Entity Relationship	Defining Constraints through SQL	CODD Rules	Recoverability in Transaction
SLO-2	Advantage of DBMS over File Systems	E-R Model Construction	SQL Aggregate Functions Introduction	Normalization: 1Nf, 2Nf, 3Nf	Concurrent Execution
SLO-3	Applications of DBMS	Case Study	Built Functions : In Numeric, Date	BCNF 4Nf and 5Nf	Concurrency Control – Lock Based, Two-Phase Control Commit
SLO-4,5&6	Lab1 : Creating a Simple DB	Lab 4: Working with Built In SQL Functions	Lab 7: Working with Aggregate Functions	Lab 10: Normalize a DB	Lab 13: Working with Transactions
SLO-7	DBMS Architecture	Issues in E-R Model	Built Functions: String, Set	Referential Integrity	DB Stored Procedures : PL/SQL
SLO-8	Over View of SQL	Keys, Attributes, Constraints	SQL Joins	Indexing: Primary, Secondary, Multilevel	Multilevel Granularity
SLO-9	SQL : Data Definition- DDL	Mapping Cardinality	Creating Sub Queries	ISAM, B-Trees	~~Deadlock Prevention~~
SLO-10,11&12	Lab2: Working with DDL	Lab 5: Working with Primary and Secondary Key	Lab 8: Working With Sub Queries	Lab 11: PL/SQL work with Iterative Statements	Lab 14: Creating DB Stored Procedures
SLO-13	SQL : Data Manipulation -DML	Extended ER - Aggregation	Transaction Control Commands : Commit, Roll Back, Save Point	PL/SQL Variables and Control Structures	PL/SQ: Exception Handling, Triggers
SLO-14	Evolution of Data Models	Extended ER – Generalization, Specialization	Relational Algebra : Fundamental Operations	Cursors and Functions in PL/SQL	Need For DB Security
SLO-15	Comparison of Data Models	Conversion of ER to Relational Table	Functional Dependency : Trivial, Non Trivial	Transactions : ACID Property	Mandatory Access control and SLO-2 Multilevel Security
SLO-16,17&18	Lab 3: Working with DML	Lab 6: Working with Nested Queries	Lab 9: Correlated Sub Queries	Lab 12: PL/SQL Working with Cursors	Lab 15: Implementation of Payroll Processing, Student Mark Report

Resources			
1	Abraham Silberschatz ,Henry F. Korth , S. Sudarshan ,Database System Concepts, McGraw Hill,2021	2	Hector Garcia-Molina ,Jeffrey Ullman , Jennifer Widom ,Database Systems: The Complete Book Hardcover , Pearson,2001
3	Raghu Ramakrishnan , Johannes Gehrke , Database Management Systems , McGraw-Hill Education (ISE Editions),1999	4	K. Prema , A. Gowri Shankar Reddy ,K. Reddy ,Database Management System Concepts , Notion Press,2020

Assessment											
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4* (10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathinamani P, Co-Founder/COO ,Datayaan Solutions Pvt. Ltd. Chennai, mani@datayaan.com	1	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai, neelanarayanan.v@vit.ac.in	1	Dr. Sweety Bakyarani. E,Department of Computer Science, FSH, SRMIST, sweetye@srmist.edu.in

Course Code	UMS24303T	Course Title	Statistical Methods	Category	D	Discipline Core / Elective Course	L	T	P	C
							4	0	0	4

Course Offering Department	Mathematics and Statistics	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes											
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	To provide foundations in Statistics																	
CLR-2	To provide a strong foundations of organizing the data, diagrammatic and graphical presentation.																	
CLR-3	To apply Statistical techniques in real life problems																	
CLR-4	To understand the characteristics of problems.																	
CLR-5	To provide the application of correlation and regression in sciences.																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	To understand the statistical modeling and its limitations, and have skill in description, interpretation and exploratory analysis of data by graphical and other means;	✓	✓	-	-	*2*	*85*	*75*	3	-	-	1	-	3	-	2	2	1
CLO-2	To calculate and apply measures of central tendency - grouped and ungrouped data cases.	✓	✓	✓	-	*2*	*85*	*75*	3	2	1	2	2	3	-	1	2	1
CLO-3	To understand and apply measures of dispersion - grouped and ungrouped data cases.	✓	✓	✓	✓	*3*	*85*	*75*	3	1	3	1	3	3	-	1	1	2
CLO-4	Find the relationship between two or more variables using correlation and regression.	✓	✓	✓	✓	*3*	*85*	*75*	3	3	2	3	3	3	-	2	3	3
CLO-5	Perform Test of Hypothesis for small sample. Learn non-parametric test such as the Chi-Square test for Independence and Goodness of Fit.	✓	✓	✓	✓	*3*	*85*	*75*	3	3	2	3	3	3	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Introduction to Statistical Methods	**Measures of Central Tendency**	**Measures of Dispersion**	**Correlation and Regression**	**Testing of Hypotheses**
	12	**12**	**12**	**12**	**12**
SLO-1	Nature and scope of Statistical methods- Definition of Statistics- Numerical Data	Measures of Central tendency – Definitions-functions-characteristics of average	Measures of Dispersion - Range – Individual, Discrete series and Continuous series	Correlation Analysis: Correlation - Definition and uses Types of correlation	Testing of Hypotheses -Testing Procedures
SLO-2	Nature of statistics	Arithmetic mean Individual series	Quartile Deviation - Individual and Discrete series	Methods for Finding Correlation Coefficient, Properties of correlation coefficient	Definition of test statistic t and its uses-t-test-Small Sample tests
SLO-3,4	Importance of Statistics – Function of Statistics-Limitations-Distrust of Statistics	Arithmetic mean Discrete series - Continuous series	Quartile Deviation - Continuous series - Mean Deviation about Mean— Individual Series Discrete Series Continuous Series	Karl Pearson's Correlation Co- efficient - Spearman's Rank Correlation Coefficient with non- repeated Ranks and repeated ranks	t-test - Test for Single Mean **- Test for two sample Means**
SLO-5	Classification-Types of classification and its good Characteristics	Arithmetic mean Cumulative series	Standard Deviation – Individual and Discrete Series	Spearman's Rank Correlation Co-efficient	t-test - t Test Statistic, when sample standard deviations are not known, but Population Standard Deviations are known
SLO-6	Tabulation-Types of Tabulation – Parts of Tabulation - Components of Good Table - Rules of construction of the table.	Arithmetic mean Merits and Demerits	Standard Deviation-Continuous Series	Problems on finding the best pair of judgments – Bivariate Distribution	Chi-Square distribution - Definition and its Uses-Testing procedure
SLO-7, 8	Components of Good Table Rules of construction of the table.- Difference between classification and tabulation.	Median Individual series -- Discrete series- Continuous series- Merits and Demerits	Standard Deviation-Continuous Series- Coefficient of Variation	Regression Analysis: Regression-Definition and Uses- Regression Coefficients- Regression Equations-Types of Regression Equations	Test based on Goodness of fit- Testing the Independence of Attributes using Chi-Square

SLO-9	Diagrammatic representation of various types of statistical data: Bar Diagram- Types of Bar diagram - One dimensional Diagrams	Mode Individual series -- Discrete series- Continuous series Merits and Demerits	Graphical solution of Dispersion Lorenz curve	Regression Equation of X on Y and Regression Equation of Y on X	F – test- Test Statistic of F- test- Uses and testing Procedures
SLO-10	Two dimensional Diagrams- Histogram- pie chart	Empirical Relation	Graphical solution of Dispersion Lorenz	Relationship between Correlation and Regression Coefficients	Testing the equality of variance using F distribution
SLO-11	Frequency Polygon - Frequency Curve- Less than O gives- more than O gives	Graphical solution of Median	Skewness- Bowley's coefficient of Skewness	- Problems on the Relationship between the Coefficients	Analysis of Variance – Definition and Uses
SLO-12	Lorenz Curve	Graphical solution of Mode	Concept of Kurtosis	- Finding the corrected Correlation Coefficient values by correcting the wrongly entered inputs	ANOVA - One Way Classification

Resources

1	Pillai, R.S.N, Bagavathi, V. (2009), Statistics, Theory and Practice,7th Edition,S.Chand Ltd, NewDelhi.	1	Gupta, S.P. (2012), Statistical Methods, 4th Edition, Sultan Chand & Sons, New Delhi.
3	Khan and Khanum, (2008), Fundamentals of Bio Statistics, 3rd Edition, Ukaaz Publications, Hyderabad.	2	Ken Black, (2013), Business Statistics for Contemporary Decision Making, 7th Edition, John Wiley Publications

Assessment						
Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1	CLA – 2	CLA – 3	CLA – 4 *	
		(10%)	(10%)	(20%)	(10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	15	15	10	10	15
2	Understand	15	15	10	10	15
3	Apply	20	25	25	25	25
4	Analyze	20	25	25	25	25
5	Evaluate	15	10	15	15	10
6	Create	15	10	15	15	10
Total (%)		100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai		Dr. N.Viswanathan, Presidency college, Chennai	1	Dr.S.Lakshmi Priya, SRMIST
2				2	Dr.J.Madhumitha,SRMIST

Course Code	UCA24P01L	Course Title	Internship - I	Category	P	Project Work / Internship	L	T	P	C
							0	0	0	1

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Demonstrate skills learnt in the real time environment.	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	Explore the different industries that are using IT																	
CLR-3	Enhance the skills in the system aspects																	
CLR-4	Understanding the professional connections with the knowledge learnt																	
CLR-5	Applying the skills in problem solving																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	To get an insight of an industry and organization/company	✓	✓	-	-	*2*	*85*	*75*	*3*	*2*	*1*	*3*	*3*	*-*	*3*	*2*	*3*	*3*
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	-	*2*	*85*	*75*	*2*	*1*	*1*	*3*	*2*	*-*	*2*	*1*	*3*	*3*
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	*3*	*85*	*75*	*2*	*3*	*3*	*3*	*2*	*3*	*3*	*1*	*3*	*3*
CLO-4	To get experience in a field to allow the student to make a career transition	✓	✓	✓	✓	*3*	*85*	*75*	*2*	*3*	*2*	*3*	*2*	*-*	*3*	*2*	*3*	*3*
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	*3*	*85*	*75*	*1*	*2*	*2*	*3*	*3*	*-*	*2*	*2*	*3*	*3*

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Assessment Component	Expected outcome	Type	Evaluators	Criteria or basis	Marks
Review-1	Internship letter Submission Internship title to be described.	Internal	Supervisor / Guide & Internship Coordinator	Feasibility Study of the Internship	20
Review-2	A short presentation about the internship work	Internal	Supervisor / Guide & Project Coordinator	Clarity of the idea, Preliminary work done.	30
Internship Report	Evaluation of internship Report	External	Examiner(s)/ Reviewer(s)	Presentation, Handling Q&A	30
Viva-Voce	Final Presentation				20

Learning Assessment				
Project Work / Internship	**Continuous Learning Assessment (50% weightage)**		**Final Evaluation (50% weightage)**	
	Review – 1	**Review – 2**	**Internship Report**	**Viva-Voce**
	20%	30 %	30 %	20 %

*Student has to be present for the viva voce for assessment. Otherwise it will be treated as non-appearance for the examination with final grade as 'Ab'

SEMESTER – IV

Course Code	USA24401J	Course Title	Python Programming	Category	C	Discipline Core Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Science	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Understand the basic concepts and features of Python Programming	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating Skills	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	Use basic flow control, including for loops and conditionals and function and string																	
CLR-3	Obtain Basic Knowledge about The List And Dictionaries																	
CLR-4	Understand the Designing application with Classes																	
CLR-5	Gain knowledge about the Exceptions And Creating the GUI Application																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Write, Test and Debug Python Programs	✓	✓	-	-	*2*	*85*	*75*	*3*	*3*	*3*	*1*	*2*	*3*	*-*	*2*	*2*	*3*
CLO-2	Implement Conditionals and Loops for Python Programs	✓	✓	✓	-	*2*	*85*	*75*	*3*	*3*	*2*	*2*	*2*	*3*	*-*	*1*	*2*	*1*
CLO-3	Use functions and represent Compound data using Lists, Tuples and Dictionaries	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*3*	*1*	*3*	*3*	*-*	*2*	*1*	*2*
CLO-4	Read and write data from & to files in Python and develop Application using oops concepts	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*3*	*3*	*3*	*3*	*-*	*2*	*3*	*3*
CLO-5	Identify Exceptions And Creating the GUI Application	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*3*	*2*	*3*	*3*	*-*	*3*	*3*	*3*

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Introduction to Python Programming	**Functions and String**	**List and Dictionaries**	**Designing with Classes**	**Exceptions and Creating the GUI**
	18	**18**	**18**	**18**	**18**
SLO-1	Introduction: The need of Python Programming Language, History and features of Python Programming	Functions: Function Calls, Type Conversion Functions Math Functions.	Introduction to Lists- List literals, Basic list operators- Replacing an Element in a List	Introduction to classes, Objects and Classes, Example program for class	Exception Basics Exception Handler, User-Defined Exceptions, Default Exception Handler
SLO-2	The first Python program, Running and Debugging Python program.	Composition, Adding New Functions. Definitions and Uses, Flow of Execution	Example program to Replace an Element in a List. List Methods for InsertingElements	Do strings- Method Definitions The init Method	Exception Coding Details Exception objects. Built-in-Exception Categories.
SLO-3	Syntax Errors, Runtime Errors and Semantic Errors, Introducing python object types	Parameters and Arguments, Variables and Parameters are Local, Functions and Void Functions	Program to List Methods for Inserting Elements, List Methods for Removing Elements.	Instance Variables, The str Method	Creating the GUI Form and Adding Widgets Button, Canvas, Check button Entry, Frame, Label, List box.
SLO-4,5&6	Lab 1: Write a Python code to display system information using pywhois.	Lab 4: Write a Python code to implement a simplecalculator.	Lab 7: Implement Transpose a Matrix Program to List Methods for Inserting Elements	Lab 10: Program usingclasses and methods.	Lab 13: Crate GUI based Application using python
SLO-7	Numbers and String, List and types, Dictionaries- Mapping Operations- Tuples.	Importing with from, Return Values, Composition- Boolean Functions	Method for Searching a List and Sorting a List.	Accessor- Mutators The Lifetime of Objects, Rules for Defining a Simple Class	Crating Menu and Menu button, Message, Radio button, Scale, Scrollbar, text, Top-level
SLO-8	Variables and Variable Names rules, Expressions and Keywords, Type conversion.	Recursion - Checking Types, String: String Literals.	Mutator Methods Aliasing- Aliasing side effects	Rational Number Arithmetic and Operator Overloading	TkMessagebox. Handling Standard attributes Properties of Widgets
SLO-9	Operators and Operands-Order of Operations.	String Indexing and Slicing, String Methods	Equality: Object Identity,	Comparison Methods, Equality and the eq Method	Spinbox, PanedWindow, LabelFrame
SLO-10,11&12	Lab 2: Write a python program to implement Magic 8 Ball is a toy used for fortune-telling or seeking advice.	Lab 5: Write a program to Find the Factorial of a given Number, Convert Decimal to Binary, Octal and Hexadecimal.	Lab 8: Write a program using a List to Find the Median of a Set of Numbers Program using sorting and searching	Lab 11: Write a Python Programfor Operator overloading.	Lab 14: Designing GUI applications with proper Layout Management features.
SLO-13	Conditional Statements And Looping Statements	Testing for a Substring with in Operator, Program using substring	Tuples, Creation of several tuples	Functions as First-Class Data Objects, Mapping Methods.	Layout Management
SLO-14	Working of if Statement If, if-else, nested if –else statements.	String formatting Expression	Dictionaries Dictionary Literals	Filtering, Reducing function	Input of Objects and the try- except Statement

SLO-15	Demonstration of program using while –do loop and do while loop	String formatting method calls. Example Program for slicing substrings	Adding Keys and Replacing Values. Accessing Values Removing Keys Traversing a Dictionary	Using lambda to CreateAnonymous Functions. Creating Jump Tables	Designing GUI using different appearances of widgets -Storage of Objects.
SLO-16,17&18	Lab 3: i. Write a program to check whether a number is prime or not, ii. Write a Python Program to Generate a Random Number	Lab 6: Write a Program to read and write text and numbers.	Lab 9: Write a Program to Adding Keys and Replacing Values python programming	Lab 12: Write the code for a filtering that generates a list of the positive numbers in a list named numbers. You shouldduse a lambda to create the auxiliary function.	Lab 15: Write a Program using polymorphism, abstract classes.

Resources

1	Mark Lutz, Learning Python, O'Reilly Media, 2009	2	Kenneth A. Lambert Fundamentals of Python: First Programs, Course Technology, Cengage Learning,2012

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathinamani P, Co-Founder/COO ,Datayaan Solutions Pvt. Ltd. Chennai, mani@datayaan.com	1	Dr. Neelanarayanan, Professor, School of Computer Science and Engineering, VIT Chennai, neelanarayanan.v@vit.ac.in	1	Dr. D.Elangovann, elangovd@srmist.edu.in
				2	

Course Code	UMS24D01T	Course Title	Resource Management Techniques	Category	D	Discipline Core / Elective Course	L	T	P	C
							4	0	0	4

Course Offering Department	Mathematics and Statistics	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes											
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	To provide foundations in Operations Research																	
CLR-2	To apply basic concepts of Linear programming problems																	
CLR-3	To learn and understand Operations research approach to various applications																	
CLR-4	To provide a set of algorithms for solving sequencing problems																	
CLR-5	To employ appropriate methods of Game theory																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	To recognize the scope and models of Operations research methods for decision making process.	✓	✓	-	-	*2*	*85*	*75*	*3*	-	-	*1*	-	*3*	-	*2*	*2*	*1*
CLO-2	To apply Operations research techniques for solving real life problems	✓	✓	✓	-	*2*	*85*	*75*	*3*	*2*	*1*	*2*	*2*	*3*	-	*1*	*2*	*1*
CLO-3	To know optimization through various transportation and assignment problems	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*1*	*3*	*1*	*3*	*3*	-	*1*	*1*	*2*
CLO-4	To schedule jobs through machines using the prescribed algorithm	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	*3*	*3*	*3*	-	*2*	*3*	*3*
CLO-5	To calculate saddle point, strategy and value of the game by various methods	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	*3*	*3*	*3*	-	*3*	*3*	*3*

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Introduction to Operations Research	**Linear Programming**	**Transportation & Assignment Problems**	**Sequencing Problems**	**Game Theory**
	12	**12**	**12**	**12**	**12**
SLO-1	Introduction to Operations Research(O.R)	Introduction to Linear Programming Problem (LPP)	Transportation Problems(TP) - Examples, Definitions – decision variables, supply and demand constraints	Sequencing Problems: Introduction;	Game theory: Definitions, Examples; Characteristics of Game theory
SLO-2	Scope of O.R, Some O.R. Models;	Mathematical formulation of LPP; Basic assumptions to formulate LPP; Procedure for forming a LPP model; Formulation of LPP Model	Mathematical formulation of TP; Balanced and Unbalanced TP; Methods for finding Initial basic feasible solution	Assumptions made while solving Sequencing problem; Total elapsed time, Idle time, No passing Rule;	Pure Strategies: Maximin -Minimax Principle, Saddle point and value of the game
SLO-3	Characteristics of O.R; Principles of Modelling; General methods for solving O.R. Models	Graphic method of solving LPP; Graphic method Special Cases: Infeasibility, Unboundedness, Redundancy.	North West Corner Rule; Row Minima Method; Column Minima Method;	Procedure for sequencing n jobs on 2 machines	Mixed Strategies: Games without saddle points
SLO-4	Various models-	Unboundedness, Redundancy.	Problems based on the above methods	Procedure for sequencing n jobs on 2 machines	Mixed Strategies: Games without saddle points
SLO-5	Main phases of O.R: Formulation of the problems;	Advantages of LPP	Least Cost Method	Sequencing n jobs on 2 machines	Solving 2x2 games;
SLO-6	Construction of a mathematical model	Limitations of LPP	Vogel's Approximation Method (VAM)	Sequencing n jobs on 2 machines	Solving 2x2 games;
SLO-7	Solving the model constructed; Controlling and updating	General Linear Programming Problem; Types of Solutions	Unbalanced Transportation Problem; Maximization case in TP	Procedure for sequencing n jobs on 3 machines	Matrix oddment method for 3x3 games
SLO-8	Solving the model constructed, Controlling and updating	General Linear Programming Problem; Types of Solutions	Unbalanced Transportation Problem; Maximization case in TP	Procedure for sequencing n jobs on 3 machines	Matrix oddment method for 3x3 games
SLO-9	Testing the model and its solution, Implementation	Canonical form of LPP and Standard form of LPP	Assignment Problem(AP): Examples, Definitions – decision variables, supply and demand constraints	Procedure for sequencing n jobs on m machines	Matrix oddment method for nxn games
SLO-10	Role of O.R in industry; various fields; O.R and decision making;	Simplex Algorithm Introduction; Simplex method: non-degenerate basic solution, degenerate basic solution	Mathematical formulation of AP, Balanced and Unbalanced AP	Processing of 2 jobs on n machines	Dominance property
SLO-11	Role of computers in O.R.;	Simplex method: basic feasible solution	Assignment Algorithm: Hungarian Method; Solving Unbalanced AP;	Processing of 2 jobs on n machines Graphical method	Dominance property: computational details
SLO-12	Limitations of O.R.	Simplex method-problem solved	Maximization case in AP	Processing of 2 jobs on n machines Graphical method	Dominance property: computational details

Resources			
1	Resource Management Techniques by Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K. Ganesan	2	Operations Research: An Introduction.H.A. Taha
3	Linear Programming. K.G. Murthy	4	Operations Research. KantiSwarup, Gupta, P.K. and Manmohan

Assessment

	Bloom`s Level of Thinking	Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1	CLA – 2	CLA – 3	CLA – 4*	
		(10 %)	(10 %)	(20 %)	(10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	20	20	15	20	20
2	Understand	20	20	15	20	20
3	Apply	20	20	20	20	20
4	Analyze	20	20	20	20	20
5	Evaluate	10	10	15	10	10
6	Create	10	10	15	10	10
	Total (%)	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai	1	Dr. N.Viswanathan, Presidency College, Chennai	1	Dr.S.Saravanakumar, SRM IST, KTR, saravans14@srmist.edu.in
2		2		2	Dr.S.Poongodisathiya, SRM IST, KTR, poongods@srmist.edu.in

Course Code	UMS24D02T	Course Title	Numerical Methods	Category	C	Discipline Core Course	L	T	P	C
							4	0	0	4

Course Offering Department	Mathematics and Statistics	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.	Conceive	Design	Implement	Operate	Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entreprenuerial Risk Taking	PSO-1	PSO-2
CLR-2	Apply numerical methods to obtain approximate solutions to mathematical problems																	
CLR-3	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations																	
CLR-4	Analyze and evaluate the accuracy of common numerical methods.																	
CLR-5	Understand and solve problems on numerical differentiation, numerical integration& Milne's predictor-corrector method																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Gain knowledge about Bisection, Regula falsi Newton's method	✓	✓	-	-	*2*	*85*	*75*	*3*	*2*	*1*	*1*	*1*	*1*	-	*3*	*1*	*1*
CLO-2	Appreciate the concepts of simultaneous equations	✓	✓	✓	-	*2*	*85*	*75*	*3*	*3*	*1*	*1*	*1*	*3*	-	*2*	*1*	*1*
CLO-3	Understand the basic ideas about Interpolation and extrapolation	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	*1*	*1*	*2*	-	*2*	*1*	*1*
CLO-4	Acquire the knowledge on Numerical solutions of Ordinary differential equations of first and second order	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	*1*	*1*	*2*	-	*1*	*1*	*1*
CLO-5	Understand and solve the problems on Euler's and Improved Euler's Method - Modified Euler's Method, Runge-Kutta method of second and fourth order – Milne's predictor corrector method	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*2*	*2*	*1*	*1*	*1*	-	*3*	*1*	*1*

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Algebraic Equations	**Numerical solution**	**Finite difference operator**	**Numerical solutions ODE**	**Euler's method**
	12	**12**	**12**	**12**	**12**
SLO-1	Basic concepts of the algebraic equation	Numerical solution of simultaneous equations - solution of simultaneous linear algebraic equations	Finite difference operator - introduction	Numerical differentiation - Introduction - Newton's forward difference formula to get the derivative	Numerical solution of ordinary differential equation- Point wise methods
SLO-2	Basic concepts of the transcendental equations - Finding of the range of the given equation	Gauss elimination method-Direct method explanation - Problems solved based on Gauss elimination method	Forward and Backward difference operator - Relation between the operators - Relation between d and delta	Newton's backward difference formula to get the derivative- First derivative using Stirling's formula	Solution by Taylor series method- Taylor series method for simultaneous first order differential equations
SLO-3	Bisection method explained - Solving Bisection method based problems with two decimal places	Gauss elimination method with unique solution- Gauss elimination method with negative roots- Computation of the inverse of a matrix using Gauss elimination method- More problems solved by this method	Newton-Gregory forward interpolation definition - Newton-Gregory forward difference table explanation	Problems solved based on First derivative Stirling's formula - Problems solved based on second derivative Stirling's formula	Taylor series method for simultaneous second order differential equations - Problems solved based on Taylor series method
SLO-4	Bisection method based problems upto three decimal places	Jacobi Method)	- Newton-Gregory forward difference table explanation	Problems solved based on second derivative Stirling's formula	Problems solved based on Taylor series method
SLO-5	Bisection method based problems upto three decimal places	Jacobi method of iteration (Gauss-Jacobi Method) - Difference between the above methods	Newton-Gregory forward interpolation concept - Expression of any value y in terms of y_n and the corresponding backward differences of y_n	Numerical integration basic concept - A general quadrature formula for equidistant ordinates-	Euler's method - Improved euler's method- Modified euler's method
SLO-6	Bisection method based problems upto four decimal places-problems solved from these concepts	Iterative methods Jacobi method of iteration (Gauss-Jacobi Method) – basic problems	Newton-Gregory backward interpolation concept explanation - Problems solved based on the above two concept	Numerical integration using Trapezoidal rule- Trapezoidal rule formula given	Problems solved based on Modified euler's method- Problems solved based on Euler's method
SLO-7	Successive approximation method - The condition for the convergence method- Order of convergence of an iterative method- problems solved from these concepts	Convergence condition for Gauss-Jacobi Method- Gauss-Jacobi Method based problems up to two decimal places-	Newton's divided difference formula- Problems solved based on Newton's divided difference formula- Lagrange's interpolation formula for uneven intervals and its difference – problems based on these concepts	Geometrical interpretation of Trapezoidal rule - Truncation error in Trapezoidal rule - Problems solved based on Trapezoidal rule	Problems solved based on Improved Euler's method- Runge-Kutta method- second -order Runge-Kutta method- Concept- based Simple Problems on second -order Runge-Kutta method

SLO-8	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial
SLO-9	Regular falsi method Introduction- Basic concepts of Regular falsi method- Problems solved based on Regular falsi method by two decimal places	Gauss-Jacobi Method based problems up to three decimal places - Problems solved based on these concept	Lagrange's inverse interpolation formula for uneven intervals	Simpson's 1/3 rule –introduction - Difference between Trapezoidal rule Simpson's 1/3 rule- Truncation error in Simpson's 1/3 rule - Problems solved based on Trapezoidal rule and Simpson's 1/3 rule	Two decimal places based simple problems on second -order Runge-Kutta method - four decimal places based simple problems on second -order Runge-Kutta method
SLO-10	Problems solved based on Regular falsi method by three decimal places - Problems solved based on Regular falsi method by four decimal places - More problems based on Regular falsi method	Gauss Seidel iteration method- Introduction and formula explanation	Problems solved based on the Lagrange's inverse interpolation- Problems solved based on the Lagrange's inverse interpolation	Numerical integration using Simpson's 3/8 rule - Truncation error in Simpson's 3/8 rule	Problems solved based on second -order Runge-Kutta method
SLO-11	Newton-Raphson method - Introduction	Procedure and difference between the above two methods explanation	Lagrange's inverse interpolation formula for even intervals - explanation	Truncation error in Simpson's 3/8 rule	Runge-Kutta method of fourth order
SLO-12	Geometrical meaning of Newton-Raphson method- Criterian for the convergence in the above method and problems solved based on these concepts	Finding the solution by Gauss Seidel iteration method	More Problems solved based on the Lagrange's forward and inverse interpolation	Problems solved based on Simpson's 3/8rule- Problems solved based on the above three methods	Formula given for Runge-Kutta method of fourth order- Problems solved based on fourth-order Runge-Kutta method

Resources

1	Numerical methods, Dr.P. Kandasamy, Dr. K.Thilagavathy, Dr. K.Gunavathy, S Chand and Company Reprint 2020	2	Kandasamy P, Thilagavathy. K and G. Gunawathy, Numerical Methods, S.Chand& Sons, 3rd Revised Edition, 2013
3	Isaacson E. and Keller, H.B., "Analysis of Numerical Methods" Dover Publication, 1994	4	Philips G.M and Taylor P.J., "Theory and Applications of Numerical Analysis", Academic Press, 1996

Assessment						
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1	CLA – 2	CLA – 3	CLA – 4*	
		(10 %)	(10 %)	(20 %)	(10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	20	20	15	20	20
2	Understand	20	20	15	20	20
3	Apply	20	20	20	20	20
4	Analyze	20	20	20	20	20
5	Evaluate	10	10	15	10	10
6	Create	10	10	15	10	10
	Total (%)	100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. D. Arivudai nambi, Anna University, Chennai	1	Dr. N.Viswanathan, , Presidency college , Chennai	1	Dr.S.Lakshmipriya, Assistant Professor, Department of mathematics & Statistics, FSH, SRM IST, Kattankulathur
2		2		2	Dr.L.Sivakami, Assistant Professor, Department of Mathematics & Statistics, FSH, SRMIST, Kattankulathur

Course Code	UEN24S01L	Course Title	Communication Skills	Category	S	Skill Enhancement Courses	L	T	P	C
							0	0	4	2

Course Offering Department	English	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes											
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning,	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	Bridge the theoretical language knowledge with practical communication skills, essential for academic and professional contexts.																	
CLR-2	Focus on enhancing listening, speaking, reading, and writing skills, crucial for effective interaction and teamwork.																	
CLR-3	Prepare students for employability by building competence in interviews, group discussions, and professional communication.																	
CLR-4	Promote understanding and sensitivity towards linguistic and cultural diversity, key to thriving in a globalized world.																	
CLR-5	Articulate ideas and emotions clearly, overcoming language barriers.																	
CLO	**At the end of this course, learners will be able to:**																	
CLO-1	Acquire basic proficiency in listening, speaking, reading, and writing, enabling effective interaction in everyday and academic scenarios.	✓	✓	-	-	2	85	75	3	-	-	1	3	3	-	2	2	1
CLO-2	Express ideas clearly using appropriate verbal cues and non-verbal signals in social, academic, and professional contexts.	✓	✓	✓	-	2	85	75	3	-	1	2	3	3	-	1	2	1
CLO-3	Enhance their ability to comprehend, evaluate, and respond to diverse forms of written and spoken communication critically.	✓	✓	✓	✓	3	85	75	3	-	3	1	3	3	-	1	1	2
CLO-4	Produce well-organized written documents and oral presentations, showcasing logical thinking and clarity of expression.	✓	✓	✓	✓	3	85	75	3	-	2	3	2	3	-	2	3	3
CLO-5	Demonstrate awareness and sensitivity towards linguistic and cultural diversity, effectively navigating multicultural interactions.	✓	✓	✓	✓	3	85	75	3	3	2	3	2	3	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	12	12	12	12	12
SLO-1	Introduction to Communication. Types of Communication- verbal and non-verbal communication Barriers of Communication dynamics of interpersonal communication, Interpret Cross-Cultural Differences in Non-Verbal Communication Develop and Demonstrate Effective Non-Verbal Communication Skills	Introduction to Reading Skills. Discussion of techniques of Reading Skill Reading Skills.(Barriers of reading skills and strategies of effective communication through reading) Identifying common reading problems in students after making them read a few passages.	Introduction to Speaking Skills. Explaining the importance of phonetics and vocabulary Speaking Skills.(Barriers of speaking skills and strategies of effective communication through speaking) Explaining the usage of the Oxford Learner's Dictionary to learn phonetics of the words at the fundamental level.	Introduction to Writing Skills Importance of writing skills Writing Skills.(Barriers of writing skills and strategies of effective communication through writing) Explaining various forms of writing with examples:.	Introduction to appreciation of texts. Encouraging the students to share a few of their favourite lines from any sources they have read or sharing a few lines from paditthadhil piditthadhu.
SLO-2	Introduction to Digital language lab/ usage of mobile applications Equipping the listening skill of the learners Listening Skills.(Barriers of listening skills and strategies of effective communication through listening) Exploring Effective Ways of Listening.	Learners are enabled to record their speech and listen to it in order to correct their problematic areas, repetitive practices of reading select paragraphs from web resources, their standard will be measured.	The right enunciation of certain words to be taught through phonetic representation and decoding the phonetic symbols by learning to use the dictionary.. Observe and repeat and learn the phonetic pronunciation of words by practicing continuously.	Introduction to letter writing. Types of letters- Formal and Informal letters with examples. Learning E-mail etiquette. Class Assignment - write a formal letter and informal letter and check for e-mail etiquettes in writing.	Explaining why appreciating texts creates a good reader. Enabling the students to reflect in the classroom about any of their favourite books/ articles or magazines.
SLO-3	Introducing google podcasts.	The speed, fluency, pronunciation, comprehension of the words in the paragraph	Teaching the usage of Thesaurus to understand and develop various words and improve vocabulary.	Enabling the students to unleash their potentials in creative writing through writing transcripts for advertisements of any product.	Introducing the text of Letters by Mathrubootham published in the Hindu.
SLO-4	Task to write down the words from the audio they have listened to. This activity should be done in two steps. 1. Jotting down the words simultaneously as they listen to the speaker. 2. Writing the transcript of the audio through repetitive play and pause.	hints and tricks to follow where the pauses are to be followed.	Identifying common errors in concord, preposition, direct speech and indirect speech.	write a review of any book or a movie or an interview or a debate.	Reading and recitation of the text of the first letter-Enjoy within limits, says Mr. Mathrubootham Understanding characters by analyzing the usage of their style of language

SLO-5	Imitating the speakers by listening to them and attempting to learn the pronunciation of the words uttered in the audio. Repetitive listening to enhance pronunciation skills	Students group 1- reads – group 2 identifies the flaws in reading. The roles have to be exchanged between the two groups and the activity should be practiced.	Identifying common errors in tenses, punctuation, and syntactical errors. Rectifying the common errors and instructing the learners about the right usage in order to avoid common errors.	Mechanics of writing like capitalization, punctuation, spelling, correct pronoun, Preposition, concord usage can be taught. Meachnaics of writing - assessed and evaluated.	Reading of the second letter- Nobel? What Nobel, asks Mr. Mathrubootham. Mathrubootham's humour and the language of code switching from Tamil to English and vice –versa.
SLO-6	Introducing to the audios of TED TALK American Speakers. Listening to the native speakers of English Language through TED TALKS. Introducing to the audios of TED TALK British Speakers. Listening to the native speakers of English Language through TED TALKS.	Identify the key arguments in a passage -introductory point, lead point, supportive argument statement, concluding point and the common connecting word between all the key words in the passage. encouraged to identify the key arguments in other passages on their own.	Practicing how to avoid common errors. The learners are introduced to collocations for quick choice of learning how to speak in short time and how to speak effectively.	Teaching effective writing by learning to avoid common errors in concord, preposition, conjunction, relative pronouns, question tags. Practicing effective writing by learning to avoid common errors in concord, Preposition, conjunction, relative pronouns, question tags.	Reading of the third letter -Mr. Mathrubootham is fully supporting all new technologies, Mathrubootham's frustration over the failure of technologies and the language that he positively uses to denote hopelessness over technologies.
SLO-7	American and British styles can be differentiated.	Guiding the act of reading through scanning and skimming by model reading of the passages by the instructor.	Practice collocations	common errors in tenses, direct and indirect speech and syntax structure.	Reading of the fourth letter in the classroom and discussion Pizza maavu: Welcome to Mr. Mathrubootham food recipe website,
SLO-8	The recognition of different accents should be practiced by speaking after listening.	scanning and skimming activities	Idioms and phrases	Practicing effective writing by learning to avoid common errors in tenses, direct and indirect speech and syntax structure.	Mathrubootham's love for food and the miscommunication about food.

SLO-9	Learning advanced pronunciation and vocabulary through various computer applications like Woodpecker. Imitate the different sounds and accents - repeat it after listening to any of the videos from the library based on individual interest.	Loud reading and slow mind reading Pauses, pronunciation, comprehension and fluency can be checked for Improvement at this stage through repetitive practices.	A speaking task to learn- collocations, idioms and phrases, vocabulary and phonetic pronunciation Their speaking activity is to be recorded and played again to rectify the errors and highlight the problematic areas in speaking.	Teaching how to write statement of purpose for admission to higher educations, and practicing the same. Teaching how to write a story by looking at a picture. Developing the writing skill through word ladders.	Analyisng the text for regional relevance and National significance. Appreciating the aesthetics of the comic element and the embodiment of humour in the narrative in the letter
SLO-10	Repeat listening to the same time frames and move from 02.01 to 03.00 Choosing any particular time frame and practicing it.	Students -groups -checking the comprehension skills. Analyse the text of a passage. Brainstorming the comprehension Skills-questioning the key points in the passage.	Automating vocabulary through engaging the students in various activity games like solving crossword puzzle and Playing scattergories. Engaging the students to play the games in order to learn the vocabulary.	Introduction to blog writing and steps to become an effective blog writer. Encourage the readers to create their own blogs and post articles on a regular basis.	importance of bringing in the Indianized way of speaking the English Language in order to depict the character called Mathrubootham. Relatable characters of both formal and informal everyday life experiences.
SLO-11	Interested students can complete listening and reflecting the complete audio listening practice and speaking.	Cross check with misunderstanding if any and rectify- match the question and answers.	Spur of the moment speech.	Selecting any news article and learning the writing style in it.	Talk about their favourite letter from the letters of Mathrubootham by recollecting the appreciation of the text according to their perception and understanding.
SLO-12	Group activities and games can be conducted to test the listening skills by responding to the speech given by other students	Passages for reading comprehension are to be given for practice that tests their reading skills.	Prepared speech : Giving a speaking task to the students to speak on their own choice	Students are given chances to write reports on various topics.	Enabling the students to share their Appreciation of any of their favourite lines form the books they have read.

Resources			
1	Horizon- English Text Book – Compiled and Edited by the Faculty of English Departement, FSH, SRMIST, 2023	5	The Art of Public Speaking by Stephen E. Lucas- 2019
2	The Creative Writing Coursebook: Forty Authors Share Advice and Exercises for Fiction and Poetry by Julia Bell and Paul Magrs- 2001	6	Talk Like TED: The 9 Public-Speaking Secrets of the World's Top Minds by Carmine Gallo – 2014
3	On Writing: A Memoir of the Craft by Stephen King 2000	7	The Anatomy of a Book Review: A Guide for College Students by Ronald J. Weber 1994
4	The Writing Life: Writers on How They Think and Work edited by Marie Arana -2003	8	How to Write a Simple Book Review: It's easier than you think! by Allyson R. Abbott 2013

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)				Final Assessment (50 % Weightage)
		CLA-1	CLA-2	CLA-3	CLA-4*	
		(10%)	(10%)	(20%)	(10%)	
		Practice (%)	Practice (%)	Practice (%)	Practice (%)	Practice (%)
1	Remember	20	20	15	20	20
2	Understand	20	20	15	20	20
3	Apply	20	20	20	20	20
4	Analyze	20	20	20	20	20
5	Evaluate	10	10	15	10	10
6	Create	10	10	15	10	10
	Total (%)	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Krishna Raj, Sutherland Krishna.Raj1@sutherlandglobal.com-	1	Dr. J Mangayarkarasi, Associate Professor and Head, Dept. of English Ethiraj College for Women, Chennai, jmbwilson97@gmail.com	1	Dr. Pushpanjali Sampathkumar, Assistant Professor, Department of English, FSH, SRMIST
		2	Dr. K S Antonysamy, Associate Professor and Head, Dept. of English Loyola College, Chennai, antonysamyks@loyolacollege.edu	2	Dr. Shanthichitra, Professor, & Head, Department of English, FSH,SRMIST

Course Code	UCD24S03J	Course Title	Industry Oriented Employability and Leadership Skills	Category	S	Skill Enhancement Course	L	T	P	C
							1	0	2	2

Course Offering Department	Career Guidance	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*
CLR-1	Help students to develop essential skills to influence and motivate others
CLR-2	Inculcate emotional and social intelligence and integrative thinking for effective leadership
CLR-3	Create and maintain an effective and motivated team to work for the society
CLR-4	Nurture a creative and entrepreneurial mindset
CLR-5	Make students understand the personal values and apply ethical principles in professional and social contexts

CLO	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Learning Outcomes										
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Examine various leadership models and understand/assess their skills, strengths and abilities that affect their own leadership style and can create their leadership vision	✓	✓	-	-	*2*	*85*	*80*	3	2	3	2	-	-	2	3	-	-
CLO-2	Learn and master a set of practical skills such as time management, self-management, handling conflicts, team leadership	✓	✓	✓	-	*3*	*85*	*80*	2	2	1	2	2	1	2	3	-	-
CLO-3	Understand the basics of entrepreneurship and develop business plan	✓	✓	✓	✓	*3*	*85*	*80*	2	3	3	3	-	3	2	3	-	-
CLO-4	Apply the design thinking approach for leadership	✓	✓	✓	✓	*3*	*85*	*80*	-	3	2	-	2	2	1	1	-	-
CLO-5	Appreciate the importance of ethics and moral values for making of a balanced personality & be an integral human being	✓	✓	✓	✓	*3*	*85*	*80*	3	3	2	2	2	2	2	3	-	-

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	9	9	9	9	9
SLO-1	Leadership - definition & Qualities	Team building & dynamics	Management – definition & Manager traits	Innovative leadership – Concept of emotional and social intelligence	Entrepreneurship
SLO-2	Leadership – styles	Work delegation with activity	Work schedule with activity	Synthesis of human and Artificial intelligence	Successful Indian entrepreneurs – case study
SLO-3	Difference between leader and boss	Decision making with activity	Strategic planning	Design thinking	Ethics – definition & Corporate ethics
SLO-4	Case study (based on leadership styles)	Motivation & Motivation for results	Conflict management	Measuring and Sustaining innovation	Importance of ethics
SLO-5	Leadership in diverse organizational hierarchy , cultures and communications	Argumentation, Persuasion, Negotiation, Networking	Energy Management & Novel Ways to manage energy in work place – activity	Case study: Organizations with sustained innovation.	Essential elements of business ethics
SLO-6	Leading the organisation through stability and turbulence	Interpersonal communication	Workforce management	Key elements of design thinking	Creating a harmonious life with work-life balance
SLO-7	Understanding Leadership and its importance.	Budget planning	Time Management	How to transform challenges into opportunities	Ethics and Conduct : Ethical decision-making
SLO-8	Models of Leadership	Workflow optimization	Recruiting and Retaining Talent	How to develop human-centric solutions for creating socially good humans	Importance of ethical principles in professional and social contexts.
SLO-9	Basic Leadership Skills	Critical thinking and Multitasking	Conflict & Stress Management	Emerging trends in design thinking	Building ethical culture: promoting ethical behavior in organization.

Resources

1	Craig E Johnson, Meeting the ethical challenges of leadership, Sage publications, 2018	4	Alexander Osterwalder, Business Model Generation, Wiley, 2013
2	T V Rao, Managers who make a difference: Sharpening your management skill, Random House India, 2016	5	Deborah Tannen, Talking from nine to five: Women and men in the workplace, Harper Collins Publishers, 2010
3	Allan R Cohen, David L Bradford, Influence without authority, Wiley, 2018	6	Dr Carrie Picardi Leadership Essentials you always wanted to know Vibrant Publishers,2021

Assessment									
Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)							
		CLA – 1 (20 %)		CLA – 2 (20 %)		CLA – 3 (30 %)		CLA – 4 (30%)	
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	5	5	5	5	15	15	10	10
2	Understand	5	5	5	5	15	15	10	10
3	Apply	25	25	25	25	20	20	20	20
4	Analyze	25	25	25	25	20	20	20	20
5	Evaluate	20	20	20	20	15	15	20	20
6	Create	20	20	20	20	15	15	20	20
Total (%)		100	100	100	100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. P. Chockalingam, Senior Lead Software Engineer, Virtusa Consulting Services Private Ltd, DLF IT Park SEZ, Chennai – 600089 p.chockalingam1986@gmail.com -	1	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidhyapeetham, Coimbatore - 641112 g_saravanaprabu@cb.amrita.edu -	1	Mrs.Deepalakshmi S, HOD, Department of Career Guidance, FSH, SRMIST hod.dcgc.ktr@srmist.edu.in
				2	Dr. Elamathiyan E, Assistant Professor, Department of Career Guidance, FSH, SRMIST, elamathe1@srmist.edu.in

Course Code	UMI24Y01L	Course Title	My India Project	Category	Y	Mandatory Courses	L	T	P	C
							0	0	0	0

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

(Assessment Method – Fully Internal)

Assessment Tools	Marks
Review – I (Activities)	50
Review – II (Project report and Presentation)	50
Total	100

SEMESTER - V

Course Code	UCA24D03J	Course Title	Computer Networks	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Understand the evolution of computer networks using the layered network architecture	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking, Analytical Reasoning	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	Understand the addressing concepts and learn networks devices																	
CLR-3	Design computer networks using subnetting and routing concepts																	
CLR-4	Understand the error types, framing, flow control																	
CLR-5	Understand the various Medium Access Control techniques and also the characteristics of physical layer functionalities																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Understand the need for Network and various layers of OSI and TCP/IP reference model.	✓	✓	-	-	2	85	75	3	1	3	-	3	2	-	-	1	3
CLO-2	Explain various Data Communications media	✓	✓	✓	-	2	85	75	3	1	3	-	3	2	-	-	2	3
CLO-3	Identify the different types of network topologies and Switching methods.	✓	✓	✓	✓	3	85	75	3	1	3	-	3	2	-	-	2	3
CLO-4	Identify the different types of network devices and their functions within a network.	✓	✓	✓	✓	3	85	75	3	1	3	-	3	2	-	-	3	3
CLO-5	Analyze and Interpret various Network and Transport Layer protocols.	✓	✓	✓	✓	3	85	75	3	1	3	-	3	2	-	-	3	3

Session	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Evolution of Network & OSI Model	**Data Link Layer**	**Network Layer**	**Transport Layer**	**Physical Layer**
	18	**18**	**18**	**18**	**18**
SLO-1	Evolution of Computer Networks The Internet	Data Link Layer Functionalities	Network Layer Functionalities	Transport Layer Functionalities	Physical Layer - Functionalities Transmission Terminology
SLO-2	Evolution of Computer Networks The Internet	Data Link Layer Functionalities	Network Layer Functionalities	Transport Layer Functionalities	Physical Layer - Functionalities Transmission Terminology
SLO-3	Categories of Networks (LAM,WAN,MAN) A Data Communications Model- Networks	Data Link Control Line Discipline	Routers and Their Functions Routing Metrics	TCP Functionalities UDP	Analog And Digital Transmission Transmission Impairments
SLO-4,5,6	Laboratory 1: Basic Network Commands and their functionalities	Laboratory 4: Construct N/W using bus topology, Star topology	Laboratory 7: Multi-routing connection with static router	Laboratory 10: Implementing a simple application using UCP	Laboratory 13: Analyze the Working of a DNS
SLO-7	Protocols Elements of Protocol	Flow Control – Stop and Wait Flow Control – Sliding Window	Routing Table Routing Algorithm Types	UDP Functionalities TCP Vs UDP	Analog to Digital Conversion Digital to Analog Conversion
SLO-8	Network Topologies Transmission Modes in a Network	Error Control – Stop and Wait Error Control – Go back N	Distance Vector Routing Distance Vector Routing with an Example	Application Layer Functionalities HTTP	Noise in transmission Attenuation Twisted Pair-Physical Description-Applications-Unshielded And Shielded Twisted Pair
SLO-9	N/W Layard Architecture OSI Model Reference Model	Error Control –Selective Reject	Link State Routing Link State Routing Example	HTTP Messages	Coaxial Cable- Physical Description-Applications-Transmission Characteristics Optical Fiber- Physical Description Applications-Transmission Characteristics
SLO-10,11,12	Laboratory 2: Introduction to CISCO Packet Tracer (CPT)	Laboratory 5: Construct N/W using Ring topology, Mesh topology	Laboratory 8: Connecting 2 LANs Using Dynamic Routing	Laboratory 11: Analyzing the Working of RIP	Laboratory 14:Implementing a simple web server
SLO-13	Functions of the Various Layers of OSI reference model TCP/IP Reference Model	Errors in Transmission - Types	Switching in N/W Circuit-Switching	DNS Electronic mail	Compare the various features of Guided Transmission media Radio Waves -Applications-Transmission Characteristics

SLO-14	Functionalities of the Various layers of the TCP/IP reference model Comparison of the OSI and TCP/IP Reference Models	Error Detection – Parity, Checksum Error Detection - CRC	Circuit-Switching Advantages Packet-Switching Principles	Basic Electronic Mail Operation SMTP & MIME	Micro Waves Applications-Transmission Characteristics Infrared Waves Characteristics-Applications
SLO-15	Comparison of Layers Comparison of the services	Error Correction -Types Hamming Code	Advantage of Packet Switching Compare Circuit and Packet Switching	SMTP Overview-Connection Setup-Mail Transfer	Satellite Communication Compare Feature of Guided Vs Un Guided Transmission Media
SLO-16,17 &18	Laboratory 3: Build a Peer to Peer N/W using Hub and Switch. Analyze the difference between the working of a Hub and a Switch	Laboratory 6: Connecting two LANs using router with static Router	Laboratory 9: Implementing a simple application using TCP	Laboratory 14 :ARP simulation in CPT	Laboratory 15: Emulate Working of a complete N/W using CPT

Resources			
1	BehrouzA.Forouzan, ”Data Communications and Networking”, 5th Edition 2010	2	ToddLammle, “CCNA Study Guide”, Seventh Edition 2011
3	WilliamStallings, ”Data and Computer Communications”, Ninth Edition	4	

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4* (10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Dr.Sweety Bakyarani.E,SRMIST,KTR

Course Code	UCA24D04J	Course Title	Windows Programming	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Understand the basic structure of VB.Net and features of IDE																	
CLR-2	Understand .NET framework and can realize some of the major enhancements in the new version of VB																	
CLR-3	Develop programs using primitives and constructs in VB .NET																	
CLR-4	Handle controls in Forms(message Box, InputBox), Windows MDI forms and Controls (Textbox, Creating MultiLine,Word Wrap textboxes)																	
CLR-5	Understand various controls in VB.NET and able to develop programs using controls																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Design/develop programs with GUI interfaces	✓	✓	-	-	2	85	75	3	1	3	-	3	1	-	1	2	3
CLO-2	Assemble multiple forms, modules, and menus into working VB.NET solutions	✓	✓	✓	-	2	85	75	3	1	3	-	3	2	-	1	2	3
CLO-3	Develop menu based program for text manipulation	✓	✓	✓	✓	3	85	75	3	1	3	-	3	1	-	2	2	3
CLO-4	Implement lists and loops with VB.NET controls and iteration	✓	✓	✓	✓	3	85	75	3	3	3	-	3	2	-	2	3	3
CLO-5	Understand ADO .NET and develop database applications	✓	✓	✓	✓	3	85	75	3	3	3	-	3	1	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Introduction to .NET Framework	**Control Structures & Arrays**	**Inheritance & Polymorphism**	**Exception Handling & Multithreading**	**SDI & MDI**
	18	**18**	**18**	**18**	**18**
SLO-1	Evolution of the .NET Framework Overview of the .Net Framework	Control Statements If Statement	Inheritance Polymorphism& Virtual Methods	Exception Handling Default Exception Handing Mechanism	Single Document Interface(SDI) Multiple Document Interface (MDI)
SLO-2	Components of .NET Framework Common Language Runtime (CLR)	Radio Button Control Check Box Control	Abstract classes & Abstract Methods Sealed Classes	User Defined Exception Handling Mechanism Implementation for Default and User Defined Exception Handling	Implementation for SDI and MDI Dialog Boxes
SLO-3	Common Type System(CTS) Common Language Specification (CLS)	List Box Control, Group Box Control Checked List Box Control & Combo Box Control	Interfaces - Definition of an Interface Declaration of an Interface	The Throw Statement Custom Exception	Implementation for Modal and Modeless Dialog Boxes Built-in Dialog Boxes
SLO-4,5,6	Lab1:Understanding the IDE of Visual Studio, Changing background and foreground color using toolbox controls	Lab 4: String Handling Functions, Applications using group box, list box, checked list box, combo box	Lab 7: Connecting to URL using Link Label, Paint Brush Application, Application for Implementing the concept Abstract class and abstract methods	Lab 10: Application using default and User Defined Exception Handling Mechanism	Lab 13: Develop applications using SDI and MDI
SLO-7	Framework Class Library (FCL) Base Class Library	Select … Case Statement While and Do Statement	Usage of Interface Implementation of an Interface	Multithreading Usage of Threads, Thread Class	Implementation for Dialog Boxes ToolBar&StatusBarControl
SLO-8	AJAX Windows Forms	For Statement and Methods Types of methods	Multiple Implementation of an Interface and Interface with Inheritance Implementation of an Namespace	Start(), Abort() and Join() Methods Sleep(), Suspend(),Resume() Method	Database Connectivity – Introduction Advantages of ADO.NET
SLO-9	ASP.Net&ADO.Net Benefits of .Net, VB.NET Language	Arrays, One-dimensional Array Multidimensional Array	Components Access Modifiers	Implementation for Thread Class Thread Priority	Managed Data Providers Developing a Simple ADO.NET Based Application
SLO-10,11,12	Lab2: Computing area of rectangle, circle, square , Designing Math Calculator	Lab 5: Digital clock using Timer control, Design of Animation application	Lab 8: Application using ImageList, Loading pictures into picture box, Application using Interface, Components	Lab 11: Application using Thread class, Multithreading	Lab 14: Textpad Application using Dialog control, Toolbar Application, Notepad Editor

SLO-13	Development of Simple VB.Net Program Variable declaration and Initialization	Definition of Class&Usage of Class Jagged Array	Implementation for Public Access Modifier Implementation for Private Access Modifier	Synchronization I/O Streams	Creating of a Data Table Retrieving Data from Tables
SLO-14	Value Data Types &Reference Data Types Boxing& Unboxing	Constructor Overloading Instance Class Members	Implementation for Protected Access Modifier Implementation for Friend Access Modifier and Protected Friend Access Modifier	Binary Data Files Text Files, Data Files	Table Updating Disconnected Data Access Through Dataset Object
SLO-15	Arithmetic Operator, Label Control& & Button Control Text Box Control	Shared Class Members Shared Constructors	Implementation for Polymorphism Implementation for Abstract Class and Abstract Methods	FileInfo classes DirectoryInfo Classes	Object Model Data set Class SQL& OLEDB Provider
SLO-16,17,18	Lab 3: Shopping Cart Application, Student Marksheet, Application using text box control, Label and Button control	Lab 6: Sorting array in ascending and descending order, Implementing Constructor, Copy Constructor and Shared Constructor	Lab 9: Application using Sealed Class, Polymorphism, Access Modifiers	Lab 12: Application for implementing Thread priority, Synchronization, and files	Lab 15: Employee Database design with coding, Retrieving data using Grid control, Marksheet preparation using ADO.Net

Resources			
1	Muthu.C (2008), “Visual Basic.Net”, 2nd Ed, Vijay Nicole Imprints Pvt., Ltd,	2	Jeffrey R.Shaprio (2002), “Visual Basic .NET The Complete Reference”, Mac Graw Hill
3	Michael Halvorson (2010), “Visual Basic 2010 Step by Step”, Microsoft Press.	4	Harold Davis (2002), “Visual Basic.NET Programming”, Sybex.

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1 (10 %)		CLA – 2 (10 %)		CLA – 3 (20 %)		CLA – 4* (10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Dr. E. Srimathi, Assistant Professor, Department of BCA, SRM IST, Ramapuram Campus.

Course Code	UCA24D05J	Course Title	Open Source Technologies	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	2	4

Course Offering Department	Computer Applications	Pte-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1	To gain knowledge about Open Source Software
CLR-2	To Learn basic file and directory commands in Linux
CLR-3	To develop simple PHP programs
CLR-4	To understand working with arrays and functions
CLR-5	To learn various MySQL queries

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Program Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entreprenuerial Risk	PSO-1	PSO-2
CLO-1	Create files using Vi editor	✓	✓	-	-	2	85	75	3	-	2	-	3	1	-	1	2	3
CLO-2	Write PHP scripts to handle HTML forms.	✓	✓	✓	-	2	85	75	3	-	2	-	3	1	-	1	2	3
CLO-3	Write regular expressions including modifiers, operators, and metacharacters.	✓	✓	✓	✓	3	85	75	3	-	3	-	3	1	-	2	2	3
CLO-4	Create PHP programs that use various PHP library functions, and that manipulate files and directories	✓	✓	✓	✓	3	85	75	3	3	3	-	3	2	-	2	3	3
CLO-5	Analyze and solve various database tasks using the PHP language	✓	✓	✓	✓	3	85	75	3	3	3	-	3	2	-	2	3	3

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Introduction to Linux	Introduction to PHP	Functions & Strings	Arrays & Objects	Working with Database
	15	15	15	15	15
SLO-1	Introduction to Linux Features of Linux	What Does PHP Do? A Brief History of PHP	Introduction to Function Calling a Function	Introduction to Arrays Indexed Versus Associative Arrays	Introduction to MySQL Database Connecting to and disconnecting from the server
SLO-2	Introduction to Linux Distributions Widely used Linux distros	Language Basics Lexical Structure	Defining a Function Variable scope	Identifying Elements of an Array Storing Data in Arrays	Creating and using a database Selecting a database

SLO-3	Open Source software Benefits of Open Source software, Linux Files	Introduction to Data Types Scalar Types, Compound Types, Special Types	Passing parameters by value Passing parameters by reference, Default Parameters, Variable Parameters	Multidimensional Arrays Extracting Multiple Values, Converting Between Arrays and Variables, Traversing Arrays	Creating a table Loading data into a table, Retrieving information from a table
SLO-4&5	Lab 1 : Basic Linux Commands	Lab 4: Writing Simple PHP Programs	Lab 7: Passing parameters to a function	Lab 10: Arrays	Lab 13: Creating Database, tables
SLO-6	Listing files Working with ls command	Defining Variables Variable Scope	Missing Parameters Return Values	Sorting Reversing an array	Selecting particular rows Selecting particular columns
SLO-7	Displaying Files Working with cat, more, less command	Introduction to Expressions and Operators Arithmetic operators, Comparison operators, Bitwise operators	Variable Functions Anonymous Functions	Introduction to Object Creating an Object	Sorting rows Date Calculation
SLO-8	Printing Files, Working with lpr Managing Directories, Working with mkdir, rmdir, cd and pwd commands	Logical operators, Casting operators & Miscellaneous Operators Operator precedence, Introduction to Flow-Control Statements	Introduction to Strings Quoting String Constants, Variable Interpolation	Accessing Properties and Methods Declaring a Class, Declaring methods and properties	Working with Null values Pattern Matching, Counting Rows, Using more than one table
SLO-9&10	Lab 2: Creating Directory and file in Linux	Lab 5: Operators & Control Statements	Lab 8: Functions & Strings	Lab 11: Arrays & Objects	Lab 14: Working with various MySQL Queries
SLO-11	Listing directories ls command	Working with While, for, foreach, Using exit, return, goto statements	Accessing Individual Characters Cleaning Strings	Inheritance Interfaces	Introduction to Working with MySQl Database using PHP Connecting to MySQL database
SLO-12	File and directory operations find, cp, mv, rm and ln commands	Including Code form another module Working with include and require construct	Encoding and Escaping Comparing Strings	Traits Abstract Methods	Querying database Retrieving and displaying the results
SLO-13	Controlling Access to directories and files Working with chmod command, working with Vi editor	Embedding PHP in Web Pages Standard (XML) Style, SGML Style, ASP Style, Script Style	Manipulating and Searching Strings Introduction to Regular expression, Pattern matching and substituting new text for matching text	Constructors Destructors, Introduction to Introspection, Examining an Object	Modifying data Deleting data, Designing simple database application
SLO-14&15	Lab 3: Working with file commands, Creating and modifying files using Vi Editor	Lab 6: Embedding PHP script in HTML	Lab 9: String Manipulation	Lab 12:: Introspection and Serialization	Lab 15: Developing Simple Database Applications

Resources			
1	Richard Petersen - Linux : The Complete Reference ,Sixth edition (2006)	2	Rasmus Lerdorf, Kevin Tatroe, Bob Kaehms, Ric McGredy (2002), Programming PHP, O'REILLY(SPD)
3	Lee Babin, Nathan A. Good, Frank M. Kromann, Jon Stephens (2005), "PHP 5 Recipes, A problem solution approach", après	4	Vikram Vaswani (2008), PHP: A BEGINNER'S GUIDE, McGraw-Hill.

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Dr.V.Raja

Course Code	UCA24D06J	Course Title	Operating Systems	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	2	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Utilize operating systems based on its features and utility																	
CLR-2	Utilize the Process Management functions of an Operating system																	
CLR-3	Utilize the features of Memory Management concepts of an Operating system																	
CLR-4	Analyze how Device Management part of an Operating system functions																	
CLR-5	Utilize the File Management functions of an Operating system																	
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking,	Leadership Qualities,	Digital Technology Skills	Value Inculcation,	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1	Identify functions of an operating system, analyze the process management functions	✓	✓	-	-	2	85	75	3	-	2	-	3	1	-	1	2	3
CLO-2	Analyze CPU scheduling and synchronization process of an operating system	✓	✓	✓	-	2	85	75	3	-	2	-	3	2	-	2	3	3
CLO-3	Analyze the need of Memory management functions of an operating system	✓	✓	✓	✓	3	85	75	3	-	3	-	3	2	-	1	3	3
CLO-4	Identify the significance of device management and file management's role of an operating system	✓	✓	✓	✓	3	85	75	3	3	3	-	3	2	-	2	3	3
CLO-5	Identify the essentials of inter process communication in an operating system, evaluate hypervisors	✓	✓	✓	✓	3	85	75	3	3	3	-	3	2	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Introduction to OS	**Process Management**	**Process Synchronization**	**Deadlocks**	**Memory Management**
	15	**15**	**15**	**15**	**15**
SLO-1	Introduction to Operating Systems (OS): Operating System overview Operating System as a Resource Management	Process concept : Introduction Process states : Process creation and Process Termination	Process Synchronization - Background The Critical section problem	Deadlocks - System model	Memory management: introduction
SLO-2	Operations, Assembler, Compiler, Loader, Linker Evolution of Operating Systems ,Serial Processing and Batch Processing	Process state transition diagram Operation on process	Two process Solutions Multi process Solutions	Deadlock characterization Necessary conditions	Logical, physical address space Comparison of Logical, physical Address
SLO-3	Batch:, Simple, Multiprogramming Multiprocessor, Time Sharing, Parallel systems	Symmetric multiprocessing	Synchronization hardware solution	Resource Allocation Graph Methods for handling deadlocks	Swapping Organization : physical and logical organization
SLO-4&5	Lab 1: Comparison between various Operating Systems	Lab 4: Simulation of FCFS CPU scheduling algorithm Usage	Lab 7: Write a procedure for timer interrupt handler	Lab 10: Program to implement Bankers Algorithm	Lab 13: multiple partition (dynamic Memory allocation method)
SLO-6	Distributed (client-server, peer-to-peer), Real-Time (hard, soft Clustering (symmetric, asymmetric, parallel)) , Network,)	Concurrent process-Usage	Semaphores –Usage	Deadlock Prevention - Mutual exclusion, Hold and Wait No Preemption, Circular Wait	Memory allocation method Single partition allocation
SLO-7	Microkernel: Architecture, Kernel mode, User Mode, Monolithic, Differences,System Call Types	CPU Scheduling: Process Scheduler (long, short, medium term),Scheduling criteria	Semaphores –Implementation Binary semaphores	Deadlock Avoidance – Safe state Resource Allocation Graph Algorithm	Multiple partition memory management contiguous (fixed, dynamic)
SLO-8	Process control: fork(), exit(), wait() File Manipulation: open(), close()	CPU utilization, throughput, time: (a) turnaround (b) waiting (c) response Scheduling Types: FCFS, SJF	Classic Problems of Synchronization - The Bounded Buffer problem The Readers - Writers Problem	Banker's Algorithm - Safety Algorithm	Contiguous Types: memory protection, allocation, fragmentation , partitioned Compaction
SLO-9&10	Lab 2: Booting process in GNU/Linux OS	Lab 5: Priority CPU scheduling algorithm	Lab 8: classical inter process communication problem (Producer consumer)	Lab 11: Program to implement memory allocation with pages	Lab 14 : Simulation of FIFO page replacement algorithm Paging

SLO-11	File operations read(), write()	Priority ,Round Robin Scheduling	The Dinning philosophers problem Examples	Resource request algorithm Examples	Paging Segmentation
SLO-12	Operating System Services System Programs:	Other Scheduling Types Real Time Scheduling	Critical Regions: Race condition and process synchronization	Deadlock Detection - introduction	Page Replacement Algorithms Types of Replacement algorithms
SLO-13	File management Status information	Multilevel Queue Multilevel Feedback Queue	Implementation of Critical region Mutual Exclusion Algorithm: Peterson , Monitors	Single instance of each resource type Several instances of a Resource type	Examples Demand paging
SLO-14&15	Lab 3: Multithreaded Programming	Lab 6: Simulation of Round Robin CPU scheduling algorithm	Lab 9: Write a procedure to make message passing in inter process communication	Lab 12: Simulation of FIFO page replacement algorithm	Lab 15: Simulation of optimal page replacement algorithm

Resources			
1	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating systems, 9th ed., John Wiley & Sons, 2013	2	William Stallings, Operating Systems-Internals and Design Principles, 7th ed., Prentice Hall, 2012
3	Andrew S. Tanenbaum, Herbert Bos, Modern Operating systems, 4th ed., Pearson, 2015	4	Bryant O'Hallaxn, Computer systems- A Programmer's Perspective, Pearson, 2015

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Dr.M. R.Sudha

Course Code	UES24V01T	Course Title	Environmental Studies	Category	V	Value Added Course	L	T	P	C
							2	0	0	2

Course Offering Department	Biotechnology	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1	To create awareness on environment and renewable and non-renewable resources
CLR-2	To understand about ecosystem and biodiversity
CLR-3	To understand the natural and anthropogenic impact of the environmental pollution
CLR-4	To create awareness on different environmental problems
CLR-5	To create awareness on various environment protection acts and the impact of human population on environment

CLO	At the end of this course, learners will be able to:	Depth				Attainment			PLO										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
		Conceive	Design	Implement	Operate	Bloom's Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn ,Research	Leadership Qualities, Professionalism, Autonomy,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2	
CLO-1	Applying knowledge on renewable and non-renewable resources	✓	✓	-	-	1	75	70		-	1	-	-	2	1	-	-	-	
CLO-2	Understanding about ecosystem and biodiversity	✓	✓	-	-	1	80	75	3	2	-	1	-	-	2	-	-	-	
CLO-3	Gathering knowledge on impact of environmental pollution	-	✓	✓	-	2	80	75	-	3	2	-	3	-	3	-	-	-	
CLO-4	Understanding of different environmental problems	✓	-	✓	-	3	80	75	-	2	3	-	-	3	2	-	-	-	
CLO-5	Having knowledge on various environment protection acts and the impact of human population on environment problems	✓	-	✓	✓	3	80	75	-	-	3	-	3	2	1	-	-	-	

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO – 4	CLO - 5
	6	6	6	6	6
SLO - 1	Multidisciplinary nature of environmental studies, definition, scope and importance of environmental studies	Energy flow in the ecosystem, energy flow in the ecosystem, ecological succession	Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity	Disaster management- floods, earthquakes, cyclones, landslides	Air, water, wildlife - environment protection act
SLO - 2	Need for public awareness. institutions in environment, people in environment	Food chains, food webs and ecological pyramids	Environmental pollution- definition, causes, effects and control measures of air, water, and soil pollution	Social issues and the environment: From unsustainable to sustainable development	Forest conservation act; issues involved in enforcement of environmental legislation, public awareness
SLO - 3	Introduction to natural resources- renewable and nonrenewable resources - associated problems	Ecosystem, introduction, types, characteristic features, structure and functions: forest, grassland and desert ecosystems	Causes, effects and control measures of marine, and noise	Urban problems related to energy, water conservation, rain water harvesting, watershed	Human population and the environment: population growth, variation among nations

SLO - 4	Forest, water, mineral, food resources	Aquatic ecosystems; biodiversity and its conservation- genetic, species and ecosystem diversity	Causes, effects and control measures of thermal pollution and nuclear hazards	Environmental ethics: issues and possible solutions, climate change & global warming	Population explosion – family welfare programme, human rights, value education
SLO - 5	Energy and land resources; role of an individual in conservation of natural resources; equitable use of resources for sustainable lifestyles	Biogeographical classification of India, value of biodiversity, biodiversity at global, national and local levels	Role of individuals in pollution prevention	Acid rain & ozone layer depletion	HIV/AIDS, women and child welfare
SLO - 6	Concept of an ecosystem, structure and functions of an ecosystem, producers, consumers and decomposers	India as a mega diversity nation, hot-spots of biodiversity, threats to biodiversity: habitat loss, poaching of wildlife man-wildlife conflicts, endangered and endemic species of India	Solid waste management Causes, effects and control measures of urban and industrial waste	Nuclear accidents and nuclear holocaust; wasteland reclamation	Role of information technology in environment and human health

Resources			
1	Bharucha, E (2013). *Textbook of environmental studies for undergraduate courses* (2nd ed.). Orient BlackSwan.	3	Jeyalakshmi, R. (2014). Text book of environmental studies, Devi publications
2	Basu, M., & Savarimuthu, X., (2017), *SJ Fundamentals of environmental studies*. Cambridge University Press, Cambridge, United Kingdom	4	Bharucha, E (2002). *The Biodiversity of India*, Mapin Publishing Pvt. Ltd.

Assessment								Strategies				
	Bloom's Level of Thinking	Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 %weightage)		Technology		Pedagogy / Andragogy		Sustainable Development
		CLA – 1	CLA – 2	CLA– 3	CLA– 4 *			Presentation Tools	☐	Clarification/Pauses	☐	Good Health & Well Being ☐
		(10%)	(10%)	(20%)	(10%)			Learning Management System	☐	Group Discussion	☐	Quality Education ☐
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)			☐	Hands-on Practice	☐	Gender Equality ☐
1	Remember	20	20	20	20	20				Debate	☐	Life on Land ☐
2	Understand	20	20	20	20	20				Interactive Lecture	☐	Clean Water and Sanitation ☐
3	Apply	20	20	20	20	20				Brainstorming	☐	Affordable and clean energy ☐
4	Analyze	20	20	20	20	20						
5	Evaluate	20	-	20	20	20						
6	Create	-	20	-	-	-						
	Total (%)	100	100	100	100	100						

*The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Dr. Arumugam Perumal, ARMATS BIOTEK Training and Research Institute, Chennai	1	Dr. N. Banu, Bharathi Women's College (Autonomous), Chennai	1	Dr. P. Parthipan, Assistant Professor, Department of Biotechnology, FSH, SRMIST, KTR

Course Code	UCD24S04J	Course Title	Career Readiness and Professional Skills	Category	S	Skill Enhancement Course	L	T	P	C
							1	0	2	2

Course Offering Department	Career Guidance	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes											
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communicaton Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	Leadership Qualities, Professionalism, Autonomy, Ac[illegible]	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	Develop resume building practice																	
CLR-2	Prepare for interviews and group discussion																	
CLR-3	Understand the significance of team skills																	
CLR-4	Help students improve their speaking and presenting abilities																	
CLR-5	Acquire career planning skills and fully pursue a successful career path																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Understand the importance of resume preparation and face interview confidently	✓	✓	-	-	*2*	*85*	*80*	2	3	2	3	-	-	-	-	-	-
CLO-2	Perform appropriately and effectively in group discussions	✓	✓	✓	-	*3*	*85*	*80*	2	3	2	3	-	1	2	3	-	-
CLO-3	Empathize with and trust colleagues for improving interpersonal skills	✓	✓	✓	✓	*3*	*85*	*80*	3	3	3	3	1	-	3	2	-	-
CLO-4	Prepare effective presentations considering the important strategies	✓	✓	✓	✓	*3*	*85*	*80*	1	3	2	3	-	2	2	-	-	-
CLO-5	Explore sources of (online/offline) opportunities	✓	✓	✓	✓	*3*	*85*	*80*	-	3	2	3	-	1	2	2	-	-

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	9	9	9	9	9
SLO-1	Introduction of resume and its Importance - Difference between a CV, Resume and Bio Data	Mock interview – face to face	Listening as a Team Skill	Types of Presentation - Informative, Instructional, Arousing, Persuasive, Decision-making - Structure of a presentation – Introduction of the event, Introducing the speaker, vote of thanks	Process of Career Exploration - Knowing Yourself - Personal Characteristics
SLO-2	Essential components of a good resume, common errors people make while preparing a resume	Mock interview- Feedback	Trust and Collaboration - Importance of Collaboration in Organization	Improvisation and unprepared presentations, man-woman view, feedback – appreciation and critique - Dos and Don'ts	Knowledge about the World of Work - Requirements of Jobs including Self-employment
SLO-3	Resume building format -Video resume – Tips and tricks – Do's and Don'ts	Meaning and Importance of Group Discussion - types of Group Discussion	The Secret to be a high performing Team	PowerPoint presentation–body language and stage etiquette –practice session	Sources of Career Information - Career Opportunities
SLO-4	Meaning and types of interview (face to face, telephonic, video) - Dress code, background research	Procedure of Group Discussion - Ground rules - Evaluation of Group Discussion	Creativity - Meaning - Strategies to increase Creativity - creativity skills at the Workplace	PowerPoint presentation–practice session	Critical Thinking Skills - Problem Solving Skills - Ability to Learn
SLO-5	STAR Technique (situation, task, approach and response) for facing an interview	Group Discussion - Common Errors Group Discussion Rubric	Methods and Process of Creativity Skills	PowerPoint presentation–practice session	Non- Cognitive Skills - Types of non-cognitive Skills and Strategies
SLO-6	Interview procedure (opening, listening skills, closure, asking questions)	Group discussion – Types and Tips to follow	Social Skills - Peer Pressure	Presentation for Internal and External Communication - online & offline Meetings	Non-Cognitive Skills and Gaps I Socio Economic Status
SLO-7	Keys to attain success in an interview	Group Discussion Practice	Stress and Stress Management - Meaning Stress Management Techniques	Visual elements in Presentation	Brainstorming
SLO-8	Rules and Elements of an Interview	Email Drafting – formal and informal	Social and Cultural Etiquette	Oral Skills and Public Speaking Skills	Logic and Rationality of Critical Thinking
SLO-9	Preparation and Practice	Writing Email – Practice	Characteristics and Enhancing Social Skills	Speaking Skills – Practice	Habits and Traits of the Mind

Resources			
1	Scott Bennett, The Elements of Resume Style: Essential Rules for Writing Resumes and Cover Letters That Work, AMACOM, 2014	4	Paul Newton, How to deliver a presentation e-book
2	David John, Tricks and Techniques of Group Discussions, Arihant, 2012	5	Eric Garner, A-Z of Presentation, Eric Garner and Ventus Publishing ApS, 2012, bookboon.com
3	Singh O.P., Art of Effective Communication in Group Discussion and Interview, S Chand & Company, 2014		

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)							
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*	
		(20 %)		(20 %)		(30 %)		(30%)	
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	15	15	20	20	20	20
2	Understand	20	20	15	15	20	20	20	20
3	Apply	15	15	15	15	15	15	20	20
4	Analyse	15	15	15	15	15	15	20	20
5	Evaluate	15	15	20	20	15	15	10	10
6	Create	15	15	20	20	15	15	10	10
	Total (%)	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

*The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. P. Chockalingam, Senior Lead Software Engineer, Virtusa Consulting Services Private Ltd, DLF IT Park SEZ, Chennai – 600089 p.chockalingam1986@gmail.com -	1	Dr. G. Saravana Prabu, Asst. Professor, Department of English, Amrita Vishwa Vidhyapeetham, Coimbatore - 641112 g_saravanaprabu@cb.amrita.edu -	1	Mrs.Deepalakshmi S, HOD, Department of Career Guidance, FSH, SRMIST hod.dcgc.ktr@srmist.edu.in
				2	Dr. Muthu Deepa, Assistant Professor, Department of Career Guidance, FSH, SRMIST, muthudem@srmist.edu.in

Course Code	UCA24P02L	Course Title	Internship - II	Category	P	Project Work / Internship (P)	L	T	P	C
							0	0	0	1

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
CLR-1	Demonstrate skills learnt in the real time environment.	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning,	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	Explore the different industries that are using IT																	
CLR-3	Enhance the skills in the system aspects																	
CLR-4	Understanding the professional connections with the knowledge learnt																	
CLR-5	Applying the skills in problem solving																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	To get an insight of an industry and organization/company	✓	✓	-	-	*2*	*85*	*75*	*3*	*1*	*2*	*-*	*3*	*-*	*-*	*1*	*2*	*3*
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	-	*2*	*85*	*75*	*3*	*1*	*2*	*-*	*3*	*-*	*-*	*1*	*2*	*3*
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*1*	*2*	*-*	*3*	*-*	*-*	*1*	*3*	*3*
CLO-4	To get experience in a field to allow the student to make a career transition	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*1*	*2*	*-*	*3*	*-*	*-*	*1*	*3*	*3*
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*1*	*2*	*-*	*3*	*-*	*-*	*3*	*3*	*3*

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Assessment Component	Expected outcome	Type	Evaluators	Criteria or basis	Marks
Review-1	Internship letter Submission Internship title to be described.	Internal	Supervisor / Guide & Internship Coordinator	Feasibility Study of the Internship	20
Review-2	A short presentation about the internship work	Internal	Supervisor / Guide & Project Coordinator	Clarity of the idea, Preliminary work done.	30
Internship Report	Evaluation of internship Report	External	Examiner(s)/ Reviewer(s)	Presentation, Handling Q&A	30
Viva-Voce	Final Presentation				20

Assessment				
	Continuous Learning Assessment(CLA) (50% weightage)		**Final Evaluation (50% weightage)**	
	Review-1	**Review-2**	**Internship / Project Report**	**Viva-Voce***
Project Work / Internship	20%	30%	30 %	20 %

*Student has to be present for the viva voce for assessment. Otherwise it will be treated as non-appearance for the examination with final grade as 'Ab'

SEMESTER - VI

Course Code	USA24D07J	Course Title	Cloud Computing	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Understand the evolution of parallel and distributed computing	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning,	Leadership Qualities, Professionalism, Autonomy,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	Understand the architecture of cloud																	
CLR-3	Understand the need for virtualization																	
CLR-4	The concepts behind scheduling and load balancing that is happening across Heterogeneous resources in the environment																	
CLR-5	Justify the need for improved hardware and software infrastructures (servers, protocols, security algorithms)																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Defend the need for cloud computing to run an online business	✓	✓	-	-	2	85	75	3	2	3	2	2	-	2	1	2	1
CLO-2	Understand and figure out the necessities of middleware technologies	✓	✓	✓	-	2	85	75	3	1	3	-	2	-	-	2	2	1
CLO-3	Practically create a virtual environment (lab purpose using vmware)	✓	✓	✓	✓	3	85	75	3	1	3	2	3	-	2	-	1	2
CLO-4	Implement crypto algorithms that may be used in the computing environment	✓	✓	✓	✓	3	85	75	3	2	-	-	2	-	-	2	3	3
CLO-5	Use few libraries from the cloudsim to create Cloudlets, cloudlet list, scheduling modules	✓	✓	✓	✓	3	85	75	3	2	2	-	3	-	2	3	3	3

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Evolution and History of cloud computing	**Cloud Infrastructure**	**Cloud Compting Service Models**	**Data as a Service**	**Cloud Computing–Simulation**
	18	**18**	**18**	**18**	**18**
SLO-1	Introduction to Cloud Computing	Architectural Design of Computer and storage Clouds	Platform as a Service, Evolution of PaaS	Data in Cloud	Cloud Computing: Simulation Tools
SLO-2	Cloud Types, Basics types of Models	Layered Cloud Architectural Development, Cloud enabling technologies	Introduction to Paas, Paas Service Provider	DaaS: Architecture, DaaS: Advantages	Simulation Tools :CloudSim, Cloud Analyst, Simulation Tools: Green Cloud, EMUSIM
SLO-3	Layers and types of Cloud, Features of Cloud Computing	Data center technologies, Web technologies	Platform as a Service :Acquia Cloud, Platform as a Service :Amazon AWS	DaaS: Disadvantage, Database as a service	Simulation Tools: CloudSim, MR-CloudSim, Cloud based Web Applications &Service Testing Tools
SLO-4-6	Lab 1: Create a virtual machine	Lab 4: Create a drop box using Google AP	Lab 7: Encryption and Decryption ofText	Lab 10: Laboratory8:Simple Experiments in CloudSim	Lab 13: Create a Warehouse Application in Salesforce.Com
SLO-7	Cloud Computing Stack, Advantages of Cloud computing	Multitenant technologies, Service technologies	Platform as a Service: APP42PaaS, Platform as a Service: Google AppEngine	Cloud Based data storage, Advantage and limitations	Cloud based Web Applications & Service Testing Tools, Cloud Based Mobile &Multimedia Application Testing Tools
SLO-8	Components of Cloud Computing, Limitations of Cloud computing	Hardware and Infrastructure, Client net work	PaaS Application Framework, PaaS Operator Verbs	Cloud Storage Interoperability	Cloud Applications and New Opportunity, Design approach with case studies
SLO-9	Cloud Computing service Providers, Types of service provider	Security Networks, Services	Paas Developer Verbs, Advantages and challenges of PaaS	Cloud Security – Introduction, Security Risks and Best Practice	Design methodology for IaaS Service model, Google API
SLO-10-12	Lab 2: Installation of Platforms	Lab 5: TransferDatausingGoogleAPPs	Lab 8: Simple Experiments in CloudSim	Lab 11: Simple Experiments in CloudSim	Lab 14: Create a Warehouse Application in Sales force Communing Apexprog Lang
SLO-13	Virtualization, History of virtualization	Accessing the Cloud, Platforms	Software as a Service, Evolution of SaaS	Security Cloud, Security risk and Best Practices	AWS EC2 instance, Migration
SLO-14	Introduction to virtualization, Types of Virtual Machines	Web Applications, Web APIs	Basis of SaaS, Advantages of SaaS	SecurityCloud:CIA Concept, Types of Security Attacks	Specific Cloud Services Models, Introduction

SLO-15	Advantages of virtualization, Components of virtualization	Web browsers, Cloud storage	Brief Introductory part of software as a service, Saas: Unification Technologies	Security Policy Implementation, Security Policy Implementation: Policy Types	Resource allocation in cloud computing, Introduction
SLO-16-18	Lab 3: Deploying existing Apps	Lab 6: Upload and download using Google APPs	Lab 9: Simple Experiments in CloudSim	Lab 12: Simple Experiments in CloudSim	Lab 15: Implimentation of SOAP Web Services

Resources

1	Dr.AnandNayyar, (2019), “Handbook of Cloud Computing”, BPB	2	Buyya R., Broberg J., Goscinski A., “Cloud Computing: Principles and Paradigm”, John Wiley& Sons, 2011.
3	Arshdeep Bahga and Vijay Madisetti, “Cloud Computing – A Hands on Approach”, Universities Press (India) Pvt Ltd. 2014.	4	A.Srinivasan and J.Suresh, “Cloud Computing – A Practical Approach for Learning and Implementation”, Pearson India Publications 2014.

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Dr.S.Jayachandran
2		2		2	Dr. Agusthiyar.R

Course Code	UCA24D08J	Course Title	Web Development using AngularJS and MongoDB	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating Skills	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-1	Create single page applications and understand the functional behavior of dynamic web pages																	
CLR-2	Understand presentation components that look like HTML elements																	
CLR-3	Build corner to corner interactive components in dynamic web pages																	
CLR-4	Understand MVC framework/architecture of web programming/client-server architecture																	
CLR-5	Build synchronized objects across view and model components																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Make use of expressions, do data binding with external components	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Distinguish the role of MVC in creating dynamic web applications	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Understand the role of reusability and data encapsulation in the form of objects	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Distinguish RDBMS and schema design of MongoDB	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Perform query operations using MongoDB	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	HTML & Javascript	Introduction to Angular JS	Angular Applications	Mongodb	Mongodb Operations
	18	18	18	18	18
SLO-1	Introduction about HTML, Need of Scripting Language, Difference between client and server side scripting	Function Definition, Function Parameters, Calling a Function, Return Statements	Image Optimization Hydration	Lightweight injection token for libraries Angular Tools , Development workflow	i)Query an array of nested documents ii)Geospatial Queries Query Operation Examples Update Operation: updateOne(), updateMany()
SLO-2	Script tag in HTML Java Script declaration, Output printing – document. Write, innerHTML	Nested Functions, Example program - Simple calculator	Testing – Code Coverage, Testing Services, Basics Testing Components, Test Pipes, Testing Utility	CLI Builders Language Service	replaceOne(), findAndModify() Update operation :Examples Delete Operation: deleteMany(), deleteOne()
SLO-3	window .alert, console.log Java script statements, Comments and Variables	Web stacks introduction Difference between php and java script LAMP, LEMP, MEAN, MERN	Internationalization Example Angular Applications	Dev Tools Schematics	iii)findOneAndDelete() Delete operation Examples Operation on Mongodb Data: projection
SLO-4-6	Lab 1: Java Script Input and Output	Lab 4: Functions	Lab 7: Create an interface	Lab 10: creating database	Lab 13: Working with Update and Delete operations
SLO-7	Java script Operators -Logical, Bitwise, Arithmetic and Assignment operators Java Script Datatypes - numeric	Introduction About Angular, Getting Started	Animation – Transition and Triggers, Complex Sequence, Reusable Animations, Route Transition Animations	Introduction about database, Schema DBMS and RDBMS	Limiting Records Sorting Records Single Field, Compound, Multikey
SLO-8	Java Script Datatypes – non numeric	Understanding Angular, Overview, Component,Template, Directives, Dependency Injection	Service workers & PWA Web Workers	MongoDB Datatypes: i)Integer ii)Boolean iii)Double iv)String v)Arrays vi)Object vii)Null viii)Regular expression ix)Timestamp x)Date xi)Object ID Installing MongoDB in Windows, Linux and Mac Operating Systems	Geospatial,text Index, Hashed Index Properties of Index i)Unique Indexes ii)Partial Indexes

SLO-9	Conditional statements If else statements Switch statements, Iteration statements	Developer Guides, overview, standalone, change detection, Routing and navigation	Server side rendering Pre rendering	Installing and Working with MongoDB interfaces: i)Mongo Shell, ii)Mongo Compass Introduction to entities of MongoDB: i)Databases i)Collections and iii)Documents Database: i)createDatabase()method with example ii)dropDatabase() method with example	iii)Sparse Indexes iv)TTL Indexes Aggregation in Mongodb: i)aggregate() method Aggregate expressions: i) $sum ii) $avg iii) $min iv) $max v) $push vi) $addToSet vii) $first viii) $last
SLO-10-12	Lab 2: Java Script Operators and Conditions	Lab 5: Hello World, Create Home Component	Lab 8: Animation	Lab 11: Data base Collection	Lab 14: Perform Various Aggregation Method
SLO-13	Loop Controls – for loop While loop Do while Loop For each loop	Forms , Reactive Forms, Building dynamic forms	Angular Libraries Feature Preview	Collections: i)createCollection() method with example ii)dropCollection() method with example Document with different types of values i)Document with Scalar Values	MongoDB Backup: Export/Import data backup using shell i)mongodump ii)mongorestore MongoDB Backup: Export/Import data backup using Mongo Compass
SLO-14	Arrays Introduction and declaring Accessing arrays, Array Properties : index, Input length, prototype	Es-build based builds, ESM default imports vs. namespace imports	Best Practices-Security, Accessibility Keeping up to date	ii) Document with Documents as values iii)Document with Array as values	Monitoring Deployment using Mongodb: i)mongostat, mongotop iii)serverStatus, dbStats, collStats
SLO-15	Array Methods :concat, every, forEach, Array Methods :indexOf, join, lastIndexOf, toString, reduce, reverse, slice, some, sort	HTTP Client Hydration	Property binding best practices Lazy loading features modules	CRUD operation :Insert Operation i)insertOne() and ii)insertMany() with examples Perform Query Operation for the following situations i)Query on nested documents ii)Query an array	Expressions iii) Perform Mongodb data Export and Import using shell as well as mongo compass. iv)Working with mongo deployment commands
SLO-16-18	Lab 3: Looping Statements	Lab 6: Create Housing Location Component	Lab 9: Angular form, Integrate Angular forms, Build template driven forms	Lab 12: Perform CRUD operations	Lab 15: i)Creating different types of indexes

Resources			
1	Brad Green, Shyam Seshadri, Angular JS, O'Reilly, 2013	2	Shyam Seshadri, "Angular: Up and Running: Learning Angular, Step by Step", First Edition, Kindle,O'Reilly, 2018
3	MongoDB Complete Guide: Develop Strong Understanding of Administering MongoDB, CRUD Operations, MongoDB Commands, MongoDB Compass, MongoDB Server, MongoDB Replication and MongoDB Sharding English Edition. (2021). India: BPB Publications.	4	Online Official Documentation https://angular.io/docs MongoDB: https://docs.mongodb.com/manual/tutorial/getting-started/

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr. Navarathinamani P, Co-Founder/COO Datayaan Solutions Pvt. Ltd. Chennai	1	Dr. Neelanarayanan, Professor, School of Computer Science and Engineering, VIT Chennai	1	Dr. Umarani.S, Department of Computer Science and Applications, SRM Institute of Science and Technology, Ramapuram Campus

Course Code	UCA24D09T	Course Title	Software Engineering and Testing	Category	D	Discipline Core / Elective Course	L	T	P	C
							4	0	0	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
CLR-1	Familiarize the software life cycle models and software development process	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Understand the various techniques for requirements, planning and Testing	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-3	Examine the basic methodologies for software design, development, testing																	
CLR-4	Manage user expectations and software development team																	
CLR-5	Acquire the latest industry knowledge like agile for development																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Identify the process of project life cycle model and process	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Analyze and specify software requirements through a productive working Relationship Customers.	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Design the system based on Functional Oriented and Object Oriented Approach for Software Design.	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Develop the correct and robust code for the software products	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Perform by applying the test plan and various testing techniques	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO - 1	CLO - 2	CLO - 3	CLO - 4	CLO - 5
	Introduction to Software Engineering	**Business Process Engineering**	**Types of Testing**	**System Testing**	**Test Cases**
	12	**12**	**12**	**12**	**12**
SLO-1	The Evolving Role of Software Software Engineering Definition	Computer-Based Systems The System Engineering Hierarchy – System Modeling	Principles of Testing Introduction-Testing Definition	Integration testing Top down Integration testing	Performance Testing Factors of Governing
SLO-2	Software Characteristics Software Applications and A Crisis	System Simulation Comparison of various Software Development	Phases of software Error, Fault, Bug-Failure of the system –Comparison of the terms	Bottom up Integration testing Bi-Directional Integration	Regression testing Types of regression testing
SLO-3	Software Myths Types of Myths, Software Engineering : Layered Technology	Business Process Engineering: An Overview Requirements Engineering process	Types of testing- Quality assurance, Quality Control	System Integration System Acceptance Testing	Software testing strategy Best practice in regression testing
SLO-4	Problem Statement Preparation	Software requirements specification	Preparation of DFD of any Project	Functional testing	Methodology for Performance Testing
SLO-5	Software Process Software Process Models	Characteristics of Good Requirements Types of Requirements	Testing verification and validation White Box Testing	Non Functional testing Functional Vs Non Functional Testing	Tools for Performance Testing Challenges for Performance Testing
SLO-6	Linear Sequential Model Advantages And Disadvantages	Requirements Elicitation Requirements Analysis and Negotiation	Techniques of White Box Testing Black box testing	System Testing Design and Architectural Verification	Performing Initial Test, Understanding the Criteria Classifying Test Cases.
SLO-7	Prototyping Model Advantages And Disadvantages	Requirement Documentation Requirement Specification and Analysis, Software Requirement Specification and System Requirement Specifications	Techniques of Black box testing	Deployment Testing Beta Testing	Resetting the Test Cases
SLO-8	Rapid Application Development Model	Drawing E-R Diagram for any project	Static Testing, Dynamic Testing	Certification, Standards	Concluding the Results of Regression Testing
SLO-9	Evolutionary Process Models Incremental Model	Characteristics of Good SRS Document Requirement Management	Challenges in white box testing Black Box Testing	Testing for Compliance Scalability Testing	Configuration testing compatibility testing
SLO-10	Spiral Model, WIN WIN Model Advantages and Disadvantages	Software Prototyping Selecting the prototyping approach	Techniques of Black Box Testing, Structural testing	Reliability testing Stress testing	Test plan with debugging Levels of testing

SLO-11	Concurrent Development Model Component Based Development, Comparison of Process models	Specification Principles, Representation Specification Review,	Static testing Verification & Validation Techniques, Cyclomatic complexity, Control flow graph	Acceptance Testing Acceptance Criteria	Testing tools
SLO-12	Software Requirement Specification Document Preparation	Characteristics of Good E-R Diagrams	Test Case Design	Selecting Test Cases, Executing Tests	Key Issues in Software maintenance

Resources			
1	Roger S. Pressman, (2001), “Software Engineering “, Fifth edition, McGraw-Hill Higher Education - A Division of The McGraw-Hill Companies.	2	William E. Perry (2006), “Effective Methods of Software Testing”, 3rd Ed, Wiley India.
3	Srinivasan Desikan and Gopalasamy Ramesh, "Software Testing for Principles and Practices", Pearson Education.	4	Renu Rajani, Pradeep Oak (2007), “Software Testing”, TMH
5	B. B. AgarwaL , S. P. Tayal , M. Gupta, Software Engineering & Testing , Jones and Bartlett, 2010	6	Ian Sommerville, “Software Engineering”, Addison-Wesley, Ninth Edition, 2011

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1 (10 %)	CLA – 2 (10 %)	CLA – 3 (20 %)	CLA – 4* (10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	20	20	15	15	20
2	Understand	20	20	15	15	20
3	Apply	20	20	20	20	20
4	Analyze	20	20	20	20	20
5	Evaluate	10	10	15	15	10
6	Create	10	10	15	15	10
Total (%)		100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Mr .J. Venkata Subramanian, SRMIST
2		2		2	Mrs. M. R. Sudha, SRMIST

Course Code	USA24D10T	Course Title	Wireless Communication and Mobile Computing	Category	D	Discipline Core / Elective Course	L	T	P	C
							4	0	0	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes									
CLR-1	Understand the concept of Wireless and Mobile Communication	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	Learn the protocols followed in Wireless Communication	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-3	Understand the effectiveness of Mobile Nodes and IP																	
CLR-4	Identify the various types of Ad-hoc Networks																	
CLR-5	Study about latest protocols and applications of wireless and mobile standards																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Understand the concept of Wireless Communication, Spread Spectrum	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Learn the concepts of Multiplexing, Medium Access Control	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Able to understand the Mobile Communications and Standards	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Grasp the Social Awareness of Telecommunication Systems	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Defend the need for Wireless Communication in providing solution to technical problems	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Title & Content	Wireless Transmission	Wireless LAN	Wireless ATM	Mobile Computing	Mobile Telecommunication System
Duration (hour)	**12**	**12**	**12**	**12**	**12**
SLO-1	Introduction to Networks, Wireless Networks	Wireless LAN, IEEE 802.11 Architecture	Wireless ATM, Mobile Network Layer	Mobile Computing Introduction	Mobile Telecommunication System
SLO-2	Transmissions, Wireless Transmission	Protocol Architecture, MAC Management	Handover Location Management	Wireless Networking and Mobile Computing	Global System for Mobile Communication
SLO-3	Applications of Wireless Transmission	Hyper LAN, Protocol Architecture	Access Point Control Protocol, Mobile IP	Mobile Computing Applications	General Packet Radio Service
SLO-4	Frequency Radio Transmission	Channel Access Control Sub layer Medium Access Control Sub layer	DHCP	Characteristics of Mobile Computing Advancements	Universal Mobile Telecommunication System
SLO-5	Signal Propagation Multiplexing	Bluetooth	Types of Handover Handover scenarios	Structure of Mobile Computing	Commercial Mobile Operating Systems
SLO-6	Space Division Multiplexing Frequency Division Multiplexing	Bluetooth Physical layer MAC layer	Forward and Backward Handover Computer Tomography	Mobile Ad-hoc Networks	Software Development Kit IOS
SLO-7	Time Division Multiplexing Classical Aloha, Slotted Aloha	Networking Security Link Management	Mobile Quality Service APCP Objective type Test	Needs and Importance of Mobile Ad-hoc Networks	Android Operating System
SLO-8	CSMA, Demand Assigned Multiple Access Code Division Multiplexing	WATM Services Reference Model	IP Packet Delivery Agent advertisement	Ad-hoc Concepts	Blackberry, Windows OS
SLO-9	Modulations	Telecommunication System	Discovery	Ad-hoc Characteristics Applications	M-Commerce
SLO-10	Spread Spectrum	Satellite System	Tunneling & Encapsulation,	Design Issues Routing	Structure Pros & Cons
SLO-11	PRMA Medium Access Control	Broadcasting System	Reverse Tunneling,	Traditional Routing Protocols Popular Routing Protocols	Mobile Payment System
SLO-12	Multiple Access with Collision Avoidance	Handover Reference Model Handover Requirements	Optimization, DSDV, DSR	Vehicular Ad-hoc Networks Mobile Ad-hoc Networks	Security Issues

Resources			
1	William Stallings , “Wireless communication and Networks”, Second Edition, Pearson education	2	Jochen H. Schller, “Mobile Communications”, Pearson Education, New Delhi, 2007, 2nd Edition.
3	Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd. 2005	4	UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, “Principles of MobileComputing”, Springer 2003

Assessment						
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1	CLA – 2	CLA – 3	CLA – 4*	
		(10 %)	(10 %)	(20 %)	(10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	20	20	15	15	20
2	Understand	20	20	15	15	20
3	Apply	20	20	20	20	20
4	Analyze	20	20	20	20	20
5	Evaluate	10	10	15	15	10
6	Create	10	10	15	15	10
Total (%)		100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	J.Venkata Subramanian, Assistant Professor, Department of Computer Applications, SRMIST

Course Code	UCA24P03L	Course Title	Project Work	Category	P	Project Work / Internship	L	T	P	C
							0	0	4	2

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	To understand the basics of software development	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	To know about life cycle of the software development																	
CLR-3	To explore risk and people management for software development																	
CLR-4	To learn about different software tools for software development.																	
CLR-5	To know about different techniques related to software development.																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	To conceptualize a novel idea / technique into a product	✓	✓	-	-	*2*	*85*	*75*	*3*	*2*	*1*	*-*	*3*	*-*	*3*	*2*	*3*	*3*
CLO-2	To think in terms of multi-disciplinary environment	✓	✓	✓	-	*2*	*85*	*75*	*2*	*1*	*1*	*-*	*2*	*-*	*2*	*1*	*3*	*3*
CLO-3	To understand the management techniques of implementing a project	✓	✓	✓	✓	*3*	*85*	*75*	*2*	*3*	*3*	*-*	*2*	*3*	*3*	*1*	*3*	*3*
CLO-4	To experience on the challenges of teamwork	✓	✓	✓	✓	*3*	*85*	*75*	*2*	*3*	*2*	*3*	*2*	*-*	*3*	*2*	*3*	*3*
CLO-5	To prepare documentation for all aspects of design work and presentation in a professional manner	✓	✓	✓	✓	*3*	*85*	*75*	*1*	*2*	*2*	*3*	*3*	*-*	*2*	*2*	*3*	*3*

Students can choose problems of their own interest to develop software package using the programming languages/tools available. There will be two reviews conducted during the project period for all the students. At the end of the project, every student shall submit a structured project report and will take a Viva Voce examination.

Assessment Component	Expected outcome	Type	Evaluators	Criteria or basis	Marks
Review – 0 Internship	Internship letter Submission Proposed Project title to be described. Abstract of the project.	Internal	Supervisor / Guide & Project Coordinator	Feasibility Study of the project	5
Review – I Project Proposal	A short presentation about the Problem statement Literature Survey System architecture Design Specifications	Internal	Supervisor/Guide	Clarity of the idea, Preliminary work done	10
Review – II	Presentation on Techniques, Model/ Algorithm, Modules, coding Prototype of the project	Internal	Supervisor/Guide	Clarity of idea, Presentation	10
Review – III	Final presentation, Demonstration of Project.	Internal	Supervisor/Guide	Technical demonstration, Presentation	10
Report Submission	Submission of final project report	Internal	Supervisor/Guide/Project Coordinator	Regularity, Originality, Systematic progress	15
Project Report	Evaluation of Project Report	External	Examiner(s)/ Reviewer(s)	Presentation, Handling Q&A	30
Viva – Voce	Final Presentation				20

The assessment method for the project work consists of in-semester and end semester evaluations as detailed below:

Assessment							
	Continuous Learning Assessment(CLA) (50% weightage)					**Final Evaluation (50% weightage)**	
	Review-0	**Review-1**	**Review-2**	**Review-3**	**Report Submission**	**Project Report**	**Viva-Voce***
Project Work	5%	10%	10%	10%	15%	30 %	20 %

*Student has to be present for the viva voce for assessment. Otherwise it will be treated as non-appearance for the examination with final grade as 'Ab'

Course Code	UCD24V02T	Course Name	Universal Human Values	Course Category	V	Value Added Course	L	T	P	C
							2	0	0	2

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Career Guidance Cell	Data Book / Codes/Standards	-		

Course Learning Rationale (CLR):	*The purpose of learning this course is to:*
CLR-1 :	Help the students to understand need of value education, appreciate the essential complimentarily between 'values' and 'skills' and to ensure sustained happiness and prosperity which are the core aspirations of all human beings,
CLR-2 :	Help students initiate a process of dialog within themselves to know what they really want to be' in their life and profession.
CLR-3 :	Help students to understand the meaning of happiness and prosperity for a human being. understanding holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
CLR-4 :	Help students on right understanding of the Human reality and the rest of existence, harmony at all the levels of human living, and live accordingly.
CLR-5 :	Highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.

Course Learning Outcomes (CLO):	*At the end of this course, learners will be able to:*	Learning			Program Learning Outcomes									
		1	2	3	1	2	3	4	5	6	7	8	9	10
		Bloom's Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity Solving	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLO-1 :	Evaluate the significance of value inputs in formal education and start applying them in their life and profession	3	80	70	-	1	1	2	-	3	2	-	-	-
CLO-2 :	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.	3	80	75	-	-	1	2	-	3	2	-	-	-
CLO-3 :	Analyze the value of harmonious relationship based on trust and respect in their life and profession	3	85	70	-	1	1	2	-	3	2	-	-	-
CLO-4 :	Examine the role of a human being in ensuring harmony in society and nature.	3	85	80	-	-	1	2	-	3	2	-	-	-
CLO-5 :	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.	3	85	75	-	-	1	2	-	3	2	-	-	-

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	6	6	6	6	6
SLO-1	Right Understanding, Relationship and Physical Facility	Understanding Human being as the Co-existence of the Self and the Body	Harmony in the Family – the Basic Unit of Human Interaction	Understanding Harmony in the Nature	Natural Acceptance of Human Values
SLO-2	Understanding Value Education	Distinguishing between the Needs of the Self and the Body	Trust – the Foundational Value in Relationship	Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature	Definitiveness of (Ethical) Human Conduct
SLO-3	Self-exploration as the Process for Value Education	The Body as an Instrument of the Self	Respect – as the Right Evaluation	Exploring the Four Orders of Nature	A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
SLO 4	Continuous Happiness and Prosperity – the Basic Human Aspirations	Understanding Harmony in the Self	Other Feelings, Justice in Human-to-Human Relationship	Realizing Existence as Co-existence at All Levels	Competence in Professional Ethics
SLO-5	Happiness and Prosperity – Current Scenario	Harmony of the Self with the Body	Understanding Harmony in the Society	The Holistic Perception of Harmony in Existence	Holistic Technologies, Production Systems and Management Models-Typical Case Studies
SLO-6	Method to Fulfill the Basic Human Aspirations	Programme to ensure self-regulation and Health	Vision for the Universal Human Order	Exploring Co-existence in Existence	Strategies for Transition towards Value-based Life and Profession

Resources			
1	Gaur R.R., Sangal R., Bagaria G.P., 2019 (2nd Revised Edition), A Foundation Course in Human Values and Professional Ethics, Excel Books, New Delhi.	3	A Nagraj, 1998, Jeevan Vidya EkParichay, Divya Path Sansthan, Amarkantak.
2	E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.	4	A N Tripathy, 2003, Human Values, New Age International Publishers.

Assessment

Bloom's Level of Thinking		Continuous Learning Assessment (CLA) (100% weightage)			
		CLA – 1	CLA – 2	CLA – 3	CLA – 4 *
		(20 %)	(20 %)	(30 %)	(30 %)
		Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	15	15	10	10
2	Understand	15	15	10	10
3	Apply	20	25	25	25
4	Analyze	20	25	25	25
5	Evaluate	15	10	15	15
6	Create	15	10	15	15
Total (%)		100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

* The evaluation can be done on one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences, (vii) Assignments

Designers					
Professional Experts		**Higher Institution Experts**		**Internal Experts**	
1	Prof. Rajiv Kumar, Member Secretary, NCC-IP as member at AICTE	1	Mrs. V Sumathi, Associate Professor, Sri Sairam Engineering College, Chennai, Tamil Nadu	1	Dr. Supraja P, UHV University Coordinator, SRMIST
				2	Dr. Deepalakshmi S, HoD, Department of Career Guidance Cell, FSH, SRMIST
				3	Dr. Sweety Bakyarani E, Department of Computer Science, FSH, SRMIST

SEMESTER-VII

Course Code	UCA24D11T	Course Title	Research Methodology in Computer Applications	Category	D	Discipline Core / Elective Course	L	T	P	C
							4	0	0	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
CLR-1	Understand Research principles while developing software																		
CLR-2	Gain extensive knowledge about the Research concepts, methods and the process models																		
CLR-3	Obtain adequate knowledge about Research process models and software																		
CLR-4	Identify the research methods involved in various area																		
CLR-5	Gain insight on ethics of research																		
CLO	At the end of this course, learners will be able to:	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking, Creativity	Communication Skills, Collaborating Skills	Independent Thinking, Analytical Reasoning, Learning to Learn ,Research Skills	Leadership Qualities, Professionalism, Autonomy, Accountability	Digital Technology Skills	Value Inculcation, Multicultural inclusivity	Environmental Action, Community Engagement	Entrepreneurial Risk Taking	PSO-1	PSO-2	
CLO-1	To understand the Research and Evaluation techniques	✓	✓	-	-	2	85	75	*3*	-	-	*1*	-	*3*	-	*2*	*2*	*1*	
CLO-2	To plan and manage hypothesis value at each stage of the Research	✓	✓	✓	-	2	85	75	*3*	*2*	*1*	*2*	*2*	*3*	-	*1*	*2*	*1*	
CLO-3	To learn about the Research Type and find the correct methods	✓	✓	✓	✓	3	85	75	*3*	*1*	*3*	*1*	*3*	*3*	-	*1*	*1*	*2*	
CLO-4	To develop Research skill	✓	✓	✓	✓	3	85	75	*3*	*3*	*2*	*3*	*3*	*3*	-	*2*	*3*	*3*	
CLO-5	To understand the ethics followed in research	✓	✓	✓	✓	3	85	75	*3*	*3*	*2*	*3*	*3*	*3*	-	*3*	*3*	*3*	

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	FOUNDATIONS OF RESEARCH	**DATA PREPARATION**	**RESEARCH DESIGN**	**DATA SAMPLING**	**RESEARCH ETHICS**
	12	**12**	**12**	**12**	**12**
SLO-1	Introduction to Research Methods	Introduction to literature review	Introduction to research design	Introduction to Design of Sample Survey	Ethical Issues
SLO-2	Definition of Research	Methods to collect the meaningful data	Identify the research problem	Introduction to Census	Ethical Committees
SLO-3	Role of Research	Data Cleaning	Select a research problem	Introduction to Sample enumerations	Commercialization
SLO-4	Objectives of Research	Reviewing the data	Defining a research problem	Difference between Census V/s Sample enumerations	Copy right
SLO-5	Applications of research	Process the data	Introduction to need of research problem design	Introduction to objectives in Research sampling	Intellectual Property Rights
SLO-6	Research in Computer Science & Applications	Analysis the Data	Apply the research design with the simple data set	Introduction to principles of sampling	Patent law
SLO-7	Steps involved in research	Conceptualization of a research problem	Introduction to good design	Introduction to Types of Sampling in Research methods	Track Related aspects of Intellectual Property Rights
SLO-8	Aim and Scope of research in Computer filed	Formulation of a research problem	Feature of good research design	Sampling Errors	Reproduction of published material
SLO-9	Types of Research	Identifying the variables	Introductions to different research design	Non-sampling errors	Plagiarism
SLO-10	Research Process in the Computer Field	Assigning the initial value to the variables	Different research designs - Exploratory	Determination of the sample size	Tools for Plagiarism
SLO-11	Introduce the basic software to develop a Research	Constructing hypothesis	Different research designs - Descriptive	Designing Questionnaires	Citation and Acknowledgement
SLO-12	Research Process	Types of hypotheses	Different research designs - Experimental	Design the interview	Reproducibility and accountability

Resources			
1	Krishna Swamy K.N., Siva Kumar A.I., Mathirajan M., "Management Research Methodology (2006), Pearson Education, New Delhi.	2	Kothari C.R., "Research Methodology, Methods and Techniques, Second edition, (2008), New Age International Publication.

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1	CLA – 2	CLA – 3	CLA – 4*	
		(10 %)	(10 %)	(20 %)	(10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	40	40	30	30	40
2	Understand	40	40	30	30	40
3	Apply	40	40	40	40	40
4	Analyze	40	40	40	40	40
5	Evaluate	20	20	30	30	20
6	Create	20	20	30	30	20
Total (%)		100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Dr. V.Raja SRM IST, Vadapalani

Course Code	UDS24D12T	Course Title	Data Analytics for Project Management	Category	D	Discipline Core / Elective Course	L	T	P	C
							4	0	0	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:
CLR-1	Create an understanding why do we use data analytics in project management
CLR-2	Give exposure to know the risk in data analytics
CLR-3	Teach the analytical challenges of modern PMO
CLR-4	Create a knowledge about portfolio management
CLR-5	Impart the knowledge on Big data issues in Project Management

CLO	At the end of this course, learners will be able to:	Depth				Attainment			Program Learning Outcomes									
		1 Conceive	2 Design	3 Implement	4 Operate	1 Bloom's Level of Thinking	2 Expected Proficiency (%)	3 Expected Attainment (%)	1 Problem Solving, Critical Thinking, Creativity Solving	2 Communication Skills, Collaborating Skills	3 Independent Thinking, Analytical Reasoning, Learning to Learn, Research Skills	4 Leadership Qualities, Professionalism, Autonomy, Ability	5 Digital Technology Skills	6 Value Inculcation, Multicultural inclusivity	7 Environmental Action, Community Engagement	8 Entrepreneurial Risk Taking	9 PSO-1	10 PSO-2
CLO-1	Understand the role of data analytics in project management	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	3
CLO-2	Apply the Exploratory vs Confirmatory vs Predictive analytics	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	3
CLO-3	Understand and apply the concepts of modern PMO challenges	✓	✓	✓	✓	3	85	75	3	-	3	1	3	3	-	1	2	3
CLO-4	Recognize data analytics and Project Portfolio performance	✓	✓	✓	✓	3	85	75	3	3	-	3	3	3	-	2	3	3
CLO-5	Gain Knowledge in the concepts of Big data issues in Project Management	✓	✓	✓	✓	3	85	75	3	3	-	3	3	-	-	3	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Data Analytics in Project Management	**Data Analytics Risk**	**Analytical Challenges of Modern PMO**	**Project Portfolio Management**	**Big Data Issues In Project Environment**
	12	**12**	**12**	**12**	**12**
SLO-1	Introduction to Data Analytics in Project Management	The Risk management process	Toward an analytically matured PMO	Main role in data analytics	Determining where to start
SLO-2	Overview of Data Analytics and its Role in Project Management	Establishing Tolerance	Method and tools	data analytics and Project Portfolio performance	Pairing data with an analytical method
SLO-3	The Evolution of Project Management	Risk and data analytics language	Human Resources	Introduction to Earned value method	Big data technologies
SLO-4	Why data analytics in Project management	Data collection risk	Project Environment	EVM methods	Driving organizational Maturity and process Discipline
SLO-5	Taking Root	Risk collection	Project Knowledge Management	Earned value graphs	Gaining Stack-holder Buy-in
SLO-6	The View from 10,000	Exploratory vs Confirmatory vs Predictive	The PMO as the multilevel data analysis center	Interrupting earned value results	Communicating the value statement
SLO-7	Data Warehousing	Exploratory risk in data analytics	Project, portfolio and organization	Setting up for EVM	Assigning responsibility
SLO-8	Project Manager	Predictive risk in data analytics	Operation tactics and strategy	Units Completed, Incremental milestones, start/Finish methods	Overcoming data related challenges
SLO-9	Project Office	Predictive analysis and consequences	Introduction to Project Portfolio management	Supervisor/Resource Estimate, Cast ration, Weight or equivalent units	IT Solutions of Data Analytics as applied to Project Management, Setting the Stage
SLO-10	Chief Operating Officer, Executive Committee	Risk in communicating results	Project Portfolio management and Data analytics	EV Pitfalls	Early Warnings of Project Failure, Data Driven Governance
SLO-11	Descriptive, Predictive data analytics	Solving and resolving our data analytics risks	PPM and Decision Making	Preparing for data deluge	Analytical Tool solutions
SLO-12	Data analytics 3.0	Success	Project Portfolio management as a Rational Decision making Process, Practice and Context	Big data challenges at the project level	Project Risk mitigation through data analytics

Resources			
1	Seweryn Spalek , “Data Analytics in Project Management“ CRC Press(Taylor and Francis group)		

Assessment						
Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)				Final Assessment (50 % weightage)
		CLA – 1	CLA – 2	CLA – 3	CLA – 4*	
		(10 %)	(10 %)	(20 %)	(10%)	
		Theory (%)	Theory (%)	Theory (%)	Theory (%)	Theory (%)
1	Remember	40	40	30	30	40
2	Understand	40	40	30	30	40
3	Apply	40	40	40	40	40
4	Analyze	40	40	40	40	40
5	Evaluate	20	20	30	30	20
6	Create	20	20	30	30	20
Total (%)		100	100	100	100	100

Strategies					
Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor and Head, Department of Computer Science, University of Madras, Guindy Campus,,Chennai-600025	1	Dr N Aswini , SRMIST, Ramapuram

Course Code	UCA24D13J	Course Title	Programming using C#	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Prerequisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
CLR-1	To cover the fundamental concepts of the C# language	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	To learn various C# libraries	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-3	To understand the basis of web programming																	
CLR-4	To understand the basis of Windows Programming																	
CLR-5	To understand .NET Controls and ActiceX Data Objects																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Understand the basics of C# and .NET framework	✓	✓	-	-	2	85	75	3	1	1	-	3	-	-	1	2	3
CLO-2	Develop applications using object-oriented aspects of C#	✓	✓	✓	-	2	85	75	3	1	2	-	3	-	-	1	2	3
CLO-3	Design Windows applications	✓	✓	✓	✓	3	85	75	3	2	3	-	3	-	-	2	2	3
CLO-4	Create Database applications using ActiveX Data Objects	✓	✓	✓	✓	3	85	75	3	3	3	-	3	-	-	2	3	3
CLO-5	Develop Web based applications	✓	✓	✓	✓	3	85	75	3	3	3	-	3	-	-	3	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Introduction to C#	**OOPs Concept**	**Delegates & Exception Handling**	**Form Controls & Windows Applications**	**ADO.Net Framework**
	18	**18**	**18**	**18**	**18**
SLO-1	Introducing C# - Understanding .NET Framework Origin and Benefits	Class Fundamentals Principles, Defining Class	Delegates – Declaration, Methods Delegate Instantiation, Invocation	Programming with Basic Windows Form Controls: Button Control, Label and Link Label Control Textbox Control, Radiobutton and Checkbox Controls	ADO.Net framework Architecture of .Net Framework

SLO-2	Overview of C# Simple C# Program	Creating Objects Accessing Objects	Multicast Delegates Implementing Multicast delegates	Richtextbox Contro, Listbox and CheckedListbox Controls Simple windows	ADO.NET managed providers Types of Providers
SLO-3	Literals, Variables and Data Types Declaration and Initialization of variables	Constructors Example using Constructors	Console I/O Operations – Console Input, Output Formatted Output, Numeric Formatting, Standard Numeric Format, Custom Numeric Format	ListView Controls, Advanced Windows Form Features Menus and Toolbars	Data set – Object Model DataTable Collection
SLO-4,5&6	Lab 1: Initialization and Declaration, Data types	Lab 4: Classes, Constructors	Lab 7: Delegates	Lab 10: Create Windows Applications	Lab 13:Develop Web Applications Using Object Model
SLO-7	Operators and Expressions Evaluation of Expressions	Indexers and Properties Implementation of an indexer and property	Event Handling Application of event with Delegates	SDI and MDI Applications Building MDI Applications	Data source controls SQL DataSource, AccessDataSource
SLO-8	Program Control Statements: Branching If, If else, Elseif	Inheritance Implementation of inheritance	Errors and Exception Handling Using try, Catch	Validation Controls Types of Validation Controls	Working with Grid view Bind Data Using SQlConnection and SQL Adapter
SLO-9	Program Control Statements: Looping While, Do While, For	Abstract Class, Sealed Class Case Study	Exception Hierarchy Implementing Exception Hierarchy	Navigation Controls Types of Navigation Controls	DataList , Templates and Events in Datalist
SLO-10,11&12	Lab 2:Control Statements	Lab 5: Inheritance	Lab 8: Exception Handling	Lab 11: Develop Web Applications using Validation and Navigation Controls	Lab 14: Develop Web Application Using DataSource Control
SLO-13	Methods in C# Case Study Using Methods	Interface Sample Programs	Custom Exception Throwing our own Exceptions	Data Controls Program using Data Controls	Formview Displaying Data with Formview Control
SLO-14	Arrays : Array Class, Array List One Dimensional array, Two Dimensional array, Jagged Arrays	Operator Overloading Overloadable Operators, Defining	Multithreading in C# Creating and Starting Thread	Creating Web Applications Case Study	Repeater Control Templates and Events in Repeater

SLO-15	Arrays : Array Class, Array List One Dimensional array, Two Dimensional array, Jagged Arrays	Operator Overloading – Unary Operators, Binary Operators Operator Overloading –Binary Operators	Scheduling a Thread Synchronizing Threads	Deployment Steps to Deployment	Designing Web Application Steps to Design Web Applications
SLO-16,17&18	Lab 3:Arrays	Lab 6: Interface, Operator Overloading	Lab 9: Custom Exception, Thread	Lab 12: Develop Web Applications using Data Controls	Lab 15: Develop Web Application Using Form View and Repeater Control

Resources			
1	E. Balagurusamy, "Programming in C#-A Primer" – Fourth Edition,	2	Paul Deitel, Harvey Deitel – C# 2010 For Programmers, Deitel Developer Series – Pearson Education – 2011
3	Kogent(2010), "ASP.NET 4.0 Black Book – Platinum Edition", Dreamtech Press,New Delhi	4	Andrew Troelsen – C# and the .NET Platform – A1 Press – 2003

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526		Dr.S.Gopinathan, Professor, University of Madras, Chennai		Dr.L.Selvam

Course Code	UCA24D14J	Course Title	Internet of Things	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Demonstrate the design, communication model and enabling technologies for IoT.	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entreprenuerial Risk Taking	PSO-1	PSO-2
CLR-2	Explore the system management and domain for various applications of IoT																	
CLR-3	Categorize the various protocols that are used for developing IoT applications.																	
CLR-4	Deploy an IoT application and connect to the cloud.																	
CLR-5	Develop IoT application for real time scenario																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Apply the knowledge/understanding of mathematics, science, to the solution of complex problems applicable to the discipline	✓	✓	-	-	2	85	75	3	1	2	3	2	-	-	-	2	3
CLO-2	Design, implement, and evaluate a computer-based system, process, component, or program to meet desired solutions that meet the specified needs with suitable concern for the public health and safety, and the cultural, societal, and environmental considerations.	✓	✓	✓	-	2	85	75	3	2	2	3	3	-	-	-	2	3
CLO-3	Create, select, and apply applicable techniques, resources, and modern engineering and IT tools to complex engineering activities with an understanding of the limitations.	✓	✓	✓	✓	3	85	75	3	2	2	3	3	-	-	-	2	3
CLO-4	Function successfully as an individual, and as a member or leader in assorted teams, and in multidisciplinary settings.	✓	✓	✓	✓	3	85	75	3	3	3	-3	-	-	-	-	3	3
CLO-5	Prove knowledge and understanding of the engineering and management principles and apply the same to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	✓	✓	✓	✓	3	85	75	3	3	3	-	3	-	-	3	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Introduction to IoT	**Communication Models in IoT**	**IoT Platforms Design Methodology**	**IoT Logical Design with Python**	**Amazon Web Services for IoT**
	18	**18**	**18**	**18**	**18**
SLO-1	Introduction, Types, Applications, Merits Definition& Characteristics of IoT	Communication Models in IoT Device to Device Model	IoT Platforms Design Methodology Purpose & Requirements, process model specification, domain model specification	IoT Platforms IoT Logical Design with Python	Introduction about RESTful API Designing a RESTful Web API
SLO-2	Physical design of IoT , Things in IoT IoT protocols	Device to Cloud Model Device to Gateway Model	Information model specifications, service specifications, Iot level specifications Functional view specifications, operational view specifications.	Python Data types and Data Structures Control Flow statements	Amazon Web Services Amazon Web Services for IoT
SLO-3	logical Design of IoT IoT Functional Blocks	M2M Differences between IoT and M2M	Device & component Integration, Application development IoT System for Weather Monitoring	Classes and Python Packages for IoT JSON, XML	Creating a ID in Amazon Implementation of EC2
SLO-4,5&6	Lab 1: Explain working of Raspberry Pi.	Lab 4:Demonstrate a smart object API gateway service reference implementation in IoT toolkit	Lab 7: Explain the application framework and embedded software agents for IoT toolkit.	Lab 10:Reading Data from Internet using sensor	Lab 13: Smart Irrigation System
SLO-7	IoT Levels and Deployment Templates Levels 0, Levels 1	M2M in IoT Architecture of M2M	Purpose & Requirements, process model specification, domain model specification Information model specifications, service specifications, Iot level specifications	HTTP Lib, URL Lib SMTP Lib	Implementation of Autoscaling Implementation of S3
SLO-8	Levels 2, Levels 3 Level 4, Level 5	Software-DefinedNetworking (SDN) SDN Architecture of SDN	Functional view specifications, operational view specifications. Device & component Integration, Application development	Introduction to IoT Physical Devices Basic Building Blocks of IoT device	Implementation of RDS DynamoDB
SLO-9	IoT Deployment Challenges Domain Specific IoT	Network Function Virtualization(NFV) Architecture of NFV	IoT System for Agriculture Functional view specifications, operational view specifications.	Example Device: Raspberry Pi About the board	Implementation of DynamoDB Kinesis
SLO-10,11&12	Lab 2: Controlling LED with Raspberry Pi	Lab 5: Write and explain working of an HTTP- to-CoAP semantic mapping proxy in IoT toolkit.	Lab 8 : Arduino with ESP8266 explanation	Lab 11: Home Automation	Lab 14: Health care system

SLO-13	Home, Cities Environment, Energy systems	NFV for IOT IoT System Management	Introduction to Cloud Storage Models Stages of IoT Architecture	Raspberry Pi Interfaces &SPI Serial Introduction to Arduino	Implementation of Kinesis Case studies – Environment
SLO-14	Industry Agriculture	Advantages and Disadvantages of IoT system management Need for IoT Systems Management	Sensors/Actuators Devices , Gateway and Cloud	IoT hardware Microprocessors & Microcontrollers	IoT systems for weather Reporting Bot Renewable Energy Systems
SLO-15	Health and Lifestyle IoT components	NETCONF ,YANG and NETOPEER IoT Systems and Device Management with NETCONF-YANG	IoT Security and Interoperability Risks and Attacks&Tools for Security	Resistive Sensors, Capacitive Sensors Inductive Sensors, Electromagnetic Sensors	Forest Fire Detection&Smart grid Case studies - IoT system for Energy
SLO-16,17&18	Lab 3: Interfacing Light Sensor with Raspberry pi	Lab 6: Describe gateway as a service deployment in Iot toolkit	Lab 9: Weather Monitoring System	Lab 12: Remote Surveillance system	Lab 15:Air Pollution Monitoring System

Resources			
1	ArshdeepBahga and Vijay Madisetti, “Internet of Things - A Hands-on Approach”, Universities Press, 2015.	2	Dieter Uckelmann et.al, “Architecting the Internet of Things”, Springer, 2011.
3	CunoPfister, “Getting Started with the Internet of Things”, O’Reilly, 2011.	4	Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, Wiley, 2014.
5	HonboZhou, “The Internet of Things in the Cloud: A Middleware Perspective “, CRC Press , 2012.	6	

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Mrs M.Divya , SRMIST

Course Code	UCA24D15J	Course Title	Object Oriented Analysis and Design	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Build high quality reusable software	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills,	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	Apply UML for modeling problems																	
CLR-3	Understand Software Design Patterns																	
CLR-4	Develop reliable software systems																	
CLR-5	Apply Standardized testing approaches																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Master the vocabulary, use and idioms of the UML	✓	✓	-	-	2	85	75	3	-	1	-	3	-	-	1	2	3
CLO-2	Scope of Object Oriented Software Systems	✓	✓	✓	-	2	85	75	3	-	2	-	3	-	-	1	2	3
CLO-3	Understand and Apply UML	✓	✓	✓	✓	3	85	75	3	-	3	-	3	-	-	1	3	3
CLO-4	Design UML Architecture for a system	✓	✓	✓	✓	3	85	75	3	3	3	-	3	-	-	2	3	3
CLO-5	Develop Test Templates	✓	✓	✓	✓	3	85	75	3	3	3	-	3	-	-	3	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Introduction to OOAD	**Structural Modelling**	**Behavioral Modeling**	**Architectural Modeling**	**Patterns & frameworks**
	18	**18**	**18**	**18**	**18**
SLO-1	Introduction to OOAD OO Basics	Basics of Structural Modelling Classes, Class Diagram	Behavioral Modeling Interactions, Sequencing	Architectural Modeling, Component components and Interfaces	Patterns & frameworks Patterns & Architecture
SLO-2	Importance of Modelling Principles of Modelling	Common Modeling Techniques for classes Relationships in classes	Interactions-Links And Associations Objects Creation	Simple and Extended Components Components And Classes	Frameworks, Mechanisms Modeling Design Patterns
SLO-3	Overview of UML Where can UML be used?	Modeling Dependencies, Inheritance Modeling Structural Relationship	Modeling Flow Control by Time Modeling Flow Control by Organization	Components And Interfaces Kinds Of Components	Modeling Architecture Patterns Black Board Architectural Patterns
SLO-4,5&6	Lab 1: Case Study: ATM System	Lab 4: Case Study-Quiz System	Lab 7: Case Study: Stock Maintenance System	Lab 10: Case Study: Exam Registration System	Lab 13: Case Study: Mark Analysis
SLO-7	Overview of Conceptual Model of UML Building Blocks of UML-Things	Extensibility Mechanisms in UML Stereotypes, Tagged values, Constraints	Use case Diagrams Usecase, Actors	Organizing Components Component Diagrams	Software Quality Software Testing
SLO-8	UML Relationships Introduction to OOAD	Notes Standard Elements	Use Case Scenario Use Case and Collaborations	Modeling API using Components Modeling Tables, Files	Need for testing, Kinds of Error Testing Standards
SLO-9	OO Basics Importance of Modelling	Other Adornments in UML Modeling New Building Blocks	Organizing Usecases Modeling Context using usecases	Modeling Documents Modeling Source Code using Component Diagram	Develop Test Cases Develop test plans
SLO-10,11&12	Lab 2: Case Study: Library Management System	Lab 5: Case Study: Cellular Phone	Lab 8: Case Study:Passport Registration System	Lab 11: Case Study: Order Processing System	Lab 14: Case Study: Develop test template
SLO-13	Principles of Modelling Architecture	Modeling Comments Modeling new properties	Modeling Requirements using usecases Use case Diagram with relationships	Deployment Simple and Extended Nodes	Issues in OO Testing Testing, Unit Testing, Integration Testing
SLO-14	Object Oriented Methodologies SDLC, SDLC Phases	Modelling Group of Elements using Packages Interfaces, Object Diagrams	Activity Diagram Modeling operation using Activity Diagram, State machine	Nodes and components Organizing Nodes , Connections in Nodes, Deployment Diagrams	Black Box Testing, White Box Testing Impact of Object Orientation on Testing, GUI Testing, System Testing

SLO-15	Object Oriented Analysis, Differentiate OOA & OOD Features of OOP,OOPL, Grady Booch, Rambaugh, Methodology, Jacobson	Objects & Links, Modelling Anonymous Objects, Modeling object structures	Modeling the lifetime of an object State chart Diagram, Modeling Reactive objects using state chart	Modeling Processors, Devices, Embedded System Modeling Embedded System using Deployment Diagram	Object Oriented metrics Testing Standards
SLO-16,17&18	Lab 3:Case Study: Student Information System	Lab 6: Illustrate object diagram for Payroll Application	Lab:9: Case Study: Placement Registration System	Lab 12: Case Study: Air Line Reservation	Lab 15: Develop Test cases and Test plan for any system

Resources			
1	E Balagurusamy, Object Oriented Programming in C++, 7th ed., Tata McGraw-Hill , 2017	2	R S Salaria, Mastering Object Oriented Systems Development Programming in C++", 6th ed., Khanna Publishing,2016
3	Reema Thareja, Object Oriented Programming with C++, 1st ed., Oxford University Press, 2015	4	Robert Lafore, Object-Oriented Programming in C++, 4th ed., SAMS Publishing, 2008
5	Sourav Sahay, Object Oriented Programming with C++, 2nd ed., Oxford University Press, 2017		

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
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Course Code	UCA24D16J	Course Title	Computer Vision	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	3	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	The purpose of learning this course is to:	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Inculcate the fundamentals of computer vision	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities, Professionalism,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	To teach the functions of a Computer vision techniques involved in training the Computer vision models on different problems																	
CLR-3	Build intelligent and automated real-world Computer vision applications																	
CLR-4	To teach the participants choosing the right set of frameworks involved in building critical Computer Vision.																	
CLR-5	Introduction to Text classification, Image classification, Image detection, Object recognition, and Object detection techniques.																	
CLO	At the end of this course, learners will be able to:																	
CLO-1	Understanding the fundamental concepts of Computer vision	✓	✓	-	-	2	85	75	3	1	2	2	3	-	-	-	1	2
CLO-2	Gain hands-on solid skills, knowledge and expertise of real-world situations	✓	✓	✓	-	2	85	75	3	2	3	3	3	-	-	-	2	3
CLO-3	Expertise in Data gathering, Data collection, Model training, and model evaluation with domain-specific components.	✓	✓	✓	✓	3	85	75	3	2	3	3	3	-	-	-	3	3
CLO-4	Applying all the computer vision techniques to real -world industry problems.	✓	✓	✓	✓	3	85	75	3	3	3	3	3	-	-	-	3	3
CLO-5	Applying the right computer vision techniques for the problem statement at hand.	✓	✓	✓	✓	3	85	75	3	3	3	3	3	-	-	3	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Introduction to Computer Vision	**Computer Vision Techniques**	**Image Processing Techniques**	**Image Classification Models**	**Computer Vision in Real World Applications**
	18	**18**	**18**	**18**	18
SLO-1	Computer Vision - Introduction Computer Vision Overview	Computer Vision Workflow Steps Business Problem Identification	Computer Vision Techniques an Overview Image Processing	Image Classification Models ImageNet	Computer Vision in Real World Applications Computer Vision in Healthcare
SLO-2	Computer Vision defined from academic perspective, Computer Vision defined from Industry perspective	Success Criteria Definition Right Computer Vision Techniques	Image Processing Techniques Image Restoration, Linear Filtering, Independent Component Analysis, Pixelation	CIFAR MNIST	Computer Vision in Retail Computer Vision in Energy
SLO-3	Signal Processing for Computer Vision Pattern recognition of Computer Vision	Collect Training Data Label Train and Test Datasets	Template Matching, Image Generation Technique, Filtering Techniques in Image Processing, Linear Filter, Non Linear Filter, Box Filter, Gaussian Filter	Object Detection Models Fast R-CNN	Computer Vision in Oil & Gas Computer Vision in Automobile
SLO-4,5&6	Lab 1 : Install OpenCV Displaying images OpenCV	Lab 4 :Text in Images	Lab 7: Image Edge Detection OpenCV	Lab 10: Image Filtering Blurring OpenCV Image Filtering Blurring Gaussian Blur OpenCV	Lab 13: Image Filtering bilateral OpenCV
SLO-7	Challenges of Computer Vision Computer Vision Data Requirements	Train the computer vision model Evaluate the computer vision model	Median Filter Feature detection and matching	Faster R-CNN Computer Vision Hands On Lab Work - Build, Test and Deploy ML Models (Consumer 1)	Computer Vision in day to day life Computer vision in security systems

SLO-8	How much data is needed Is your data good enough?	Test the model Deploy the model	Harris Corner Detector, SIFT (scale invariant feature transform), SURF (speeded-up robust features), FAST (features from accelerated segment test, BRIEF (Binary Robust Independent Elementary Features), Harris Corner Detector. SIFT (scale invariant feature transform), SURF (speeded-up robust features), FAST (features from accelerated segment test)	Challenges High level decisions	Surveillance Fingerprint recognition and biometrics
SLO-9	Data Structure Data Format	Iterate the steps process Computer vision architecture	Problems that Computer Vision can Solve Text Classification	Choosing the hardware components (GPU, TPU) Building a CV Software system	Medical Imaging Object Recognition
SLO-10,11&12	Lab2: Reading &Writing images OpenCV	Lab 5: Color Space OpenCV, Thresholding OpenCV	Lab 8:Image Scaling & Rotation using OpenCV	Lab 11: Image Filtering Blurring Median Blur OpenCV, Morphological Operations Erosion OpenCV	Lab 14:Morphological Operations Opening OpenCV
SLO-13	Data Type Training Data	Data Ingestion Data Pre-processing	Image Detection Image Segmentation	Benefits Challenges	Medical Image Analysis Contentt-Based Image Retrieval
SLO-14	Validation Data Test Data	Multiprocessing Transfer Learning/Model Processing	Image Classification Object Detection	High level decisions Customer Image Segmentation	Video Data Processing Virtual Reality and Augmented Reality
SLO-15	Image Processing Techniques, Filtering Techniques in Image Processing Linear Filter, Non-Linear Filter	Data Transformation Popular Computer Vision frameworks: OpenCV, TensorFlow, Matlab	Object Recognition Object Classification	Edge Detection Techniques Canny Edge Detection	Computer vision applications in Construction Computer Vision applications in Agriculture
SLO-16,17&18	Lab 3: Draw a Rectangle, Draw a Circle	Lab 6: Finding Contours	Lab 9:Image Translation OpenCV Image Filtering OpenCV	Lab 12: Morphological Operations Dilation OpenCV	Lab 15: Morphological Operations Closing OpenCV

Resources			
1	R. Jain, R. Kasturi, and B. G. Schunck, Machine Vision, McGraw-Hill, Inc. 1995.	2	Digital Image Processing and Analysis: Application with MATLAB and CVIPtools, 3rd Edition, SE Umbaugh, Taylor&Francis/CRC Press, 2018
3	Computer Vision: Algorithms and Applications by Richard Szeliski. Available for free online	4	Computer Vision: A Modern Approach (Second Edition) by David Forsyth and Jean Ponce. Available for free online.
5	Elements of Statistical Learning by Trevor Hastie, Robert Tibshirani, and Jerome Friedman. Available for free online (Warning: Direct PDF link).	6	Multiple View Geometry in Computer Vision (Second Edition) by Richard Hartley and Andrew Zisserman. Available for free online through the UM Library (Login required).

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
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2				2	Dr.T.Papitha Christobel, SRM IST, RMP

SEMESTER - VIII

Course Code	UCA24D17J	Course Title	Web Development using Node JS and MongoDB	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	2	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*
CLR-1	Full Stack Development using Node.js
CLR-2	Design social media websites, music players and mini games via scripting
CLR-3	Building own modules
CLR-4	Understanding Node Package Manager
CLR-5	Interface with Mongo DB

CLO	*At the end of this course, learners will be able to:*	Depth				Attainment			Program Learning Outcomes									
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
		Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entreprenuerial Risk Taking	PSO-1	PSO-2
CLO-1	Install Node.js	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Create basic web applications using Node.js	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Build HTTP server using core modules	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Use stream IO to efficiently serve the web page	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Create Modules to organize server	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	HTML & Javascript	Introduction to NodeJS	Package & Modules	File Streams	Mongodb
	15	15	15	15	15
SLO-1	Need of Scripting Language Difference between client and server side scripting	Array Methods :indexOf, join, lasIndexOf, toString Array Methods : reduce, reverse, slice, some, sort	Add HTTP header Example programs	Streams – Reading a Stream Stream – Writing to a stream	Document with different types of values i)Document with Scalar Values ii)Document with Documents as values
SLO-2	Script tag in HTML Java Script declaration	Function Definition Function Parameters	Read the Query String Split the Query String	Piping the Stream Chaining the Streams	iii)Document with Array as values CRUD operation :Insert Operation i)insertOne() and ii)insertMany() with examples
SLO-3	Output printing – document. Write, innerHTML, window .alert, console.log Java script statements, Comments and Variables	Calling a Function, Return Statements Nested Functions, Example Programs	Node.js URL Module, Node.js – NPM Package Node.js File Server, Downloading and Using a Package	Node.js as a File Server, Create Files, Reading Files Delete Files, Update and rename files	Perform Query Operation for the following situations i)Query on nested documents ii)Query an array ii)Query an array of nested documents iv)Geospatial Queries Query Operation Examples, Update Operation: updateOne(), updateMany()
SLO-4&5	Lab 1: Java Script Input and Output	Lab 4: Functions	Lab 7: Query String	Lab 10: Streams and Files	Lab 13: Working with CURD operations Insert and Query
SLO-6	Java script Operators -Logical, Bitwise, Arithmetic and Assignment operators	Web stacks introduction LAMP, LEMP, MEAN, MERN Difference between php and java script	Callback – Blocking code example Callback – Non- Blocking code example Event Driven Programming	Creating a Upload Form Parse the uploaded files Save the files	Delete Operation: deleteMany(), deleteOne() iii)findOneAndDelete() Delete operation Examples Operation on Mongodb Data: projection
SLO-7	Java Script Datatypes - numeric Java Script Datatypes - non numeric	Node introduction and evolution Installing node.js and npm in windows	Working of node Application Node Even emitter class	Display the uploaded files Nodemailer Modules	Limiting Records Sorting Records Indexes in Mongodb, default _id index
SLO-8	Conditional statements If else statements Switch statements, Iteration statements	Installing node.js and npm in Linux Built in modules in node.js – http, https, Built in modules in node.js – querystring, readline	add Listener(), on(), once() removeListener(), removeAllListeners() setMaxListemers(), listeners()	Sending a email Multiple Receivers, Sending HTML	Creating and Index createIndex method Single Field, Compound, Multikey, Geospatial,text Index, Hashed Index

SLO-9&10	Lab 2: Java Script Operators and Conditions	Lab 5: Installing Node.js	Lab 8: Event Driver classes	Lab 11: Sending Mail	Lab 14: Working with CRUD operations Update and Delete
SLO-11	Loop Controls – for loop While loop	Include modules Writing first sample application	Creating Buffers, writing to buffers Reading from Buffers	Mongodb Datatypes: i)Integer ii)Boolean iii)Double iv)String v)Arrays vi)Object vii)Null viii)Regular expression ix)Timestamp x)Date xi)Object ID Installing Mongo DB in Windows, Linux and Mac Operating Systems	Properties of Index i)Unique Indexes ii)Partial Indexes iii)Sparse Indexes iv)TTL Indexes
SLO-12	Do while Loop For each loop	Creating own modules Including your own module	Converting Buffer to JSON Concatenate Buffer	Installing and Working with MongoDB interfaces: i)Mongo Shell, ii)Mongo Compass Introduction to entities of MongoDB: i)Databases i)Collections and iii)Documents	Aggregation in Mongodb: i)aggregate() method Aggregate expressions: i) $sum ii) $avg iii) $min iv) $max v) $push vi) $addToSet vii) $first viii) $last
SLO-13	Arrays Introduction and declaring Accessing arrays	Node.js – REPL Terminal – Read, Eval Node.js – REPL Terminal – Print, Loop	Compare, Copy Buffer Slice Buffer and Buffer Length	Database: i)createDatabase()method with example ii)dropDatabase() method with example	Mongodb Backup: Export/Import data backup using shell i)mongodump ii)mongorestore Mongodb Backup: Export/Import data backup using Mongo Compass
SLO-14&15	Lab 3: Looping Statements	Lab 6: Running sample application using node.js	Lab 9: Buffers	Lab 12: Working with MongoDB –create,drop,working with Collections	Lab 15: i)Creating different types of indexes ii)Aggregate data using different Aggregate expressions iii)Perform Mongodb data Export and Import using shell as well as mongo compass. iv)Working with mongo deployment commands

Resources			
1	Jason Krol, Web Development with MongoDB and Node.js, Packt Publishing, 2014	2	Bruno Joseph D'mello, Mithun Satheesh, Web Development with MongoDB and Node - Third Edition, Packt Publishing, 2017
3	Dayley, C., Dayley, B., Dayley, B. (2017). Node.js, MongoDB and Angular Web Development: The Definitive Guide to Using the MEAN Stack to Build Web Applications. United Kingdom: Pearson Education.	4	MongoDB Complete Guide: Develop Strong Understanding of Administering MongoDB, CRUD Operations, MongoDB Commands, MongoDB Compass, MongoDB Server, MongoDB Replication and MongoDB Sharding (English Edition. (2021). India: BPB Publications
5	Mithun Satheesh, Bruno Joseph D'mello, Jason Krol, Web Development with MongoDB and Node JS - Second Edition, Packt Publishing, 2015	6	Online Official Documentation MongoDB: https://docs.mongodb.com/manual/tutorial/getting-started/

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Mrs.S.Sindhu, SRMIST Dr.N.Vijayalakshmi, SRMIST
2		2		2	Mrs.S.Suriya, SRMIST

Course Code	USA24D18J	Course Title	Cyber Security	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	2	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Learn overview of cyber crimes and cyber security	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	Understand different methods of cyber attacks																	
CLR-3	Learn using tools used in cyber crime.																	
CLR-4	Understand cyber laws for organizations																	
CLR-5	Know use of forensics in cyber crime investigations																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Understand the fundamentals of keeping information safe online, recognizing illegal online activities, and the laws that govern them.	✓	✓	-	-	2	85	75	3	-	-	1	-	3	-	2	2	1
CLO-2	Identify different kinds of cyber attacks and learn about the tools used to carry out these attacks.	✓	✓	✓	-	2	85	75	3	2	1	2	2	3	-	1	2	1
CLO-3	Use different tools to gather information from various sources for cybersecurity purposes.	✓	✓	✓	✓	3	85	75	3	1	3	1	3	3	-	1	1	2
CLO-4	Utilize techniques to identify and detect unauthorized access or intrusion attempts in a system.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	2	3	3
CLO-5	Implement measures and techniques to prevent unauthorized access or intrusion into a system.	✓	✓	✓	✓	3	85	75	3	3	2	3	3	3	-	3	3	3

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Introduction to Cyber Security	**Network Scanning**	**Scanning Methodology**	**Intrusion Detection**	**Cyber Attacks**
	15	**15**	**15**	**15**	**15**
SLO-1	Cyber Security - Introduction History of Internet	Reconnaissance Harvester	Scanning Methodology Techniques	Intrusion Detection Introduction	Cyber Attacks Types and effects
SLO-2	Impact of Internet CIA Triad	Netcraft - Overview	Ping Swear Techniques	Host Based Intrusion Detection	Online auctions Online shopping
SLO-3	Cybercrime – History, Reasons for Cybercrime	Host, Extracting Information - DNS	Nmap Commands, Switches	Network Based Intrusion detection	Online games
SLO-4&5	Lab 1: Substitution & transposition techniques Ceaser Cipher	Lab 4: Diffie-Hellman Key Exchange algorithm	Lab 7: chkrootkit security audit tool	Lab 10: Installing SNORT either Lnux/windows	Lab 13: Content Matching
SLO-6	Classification of cyber crimes Cybercriminals	Extracting Information from EMail Servers	SYN Scan Types - TCP, UDP Scan	Distributed or Hybrid Intrusion Detection	Spyware Scrumware
SLO-7	Need for Cyber Security Cyber laws	Social Reconnaissance Scanning	Connect Scan Half-open Scan	Exchange format Honeypots	Internet addiction Theft of identity
SLO-8	The Indian IT Act Punishment for cyber crimes	Port Scanning Pros and Cons	Stealth XMAS Scan	SNORT Types Modes in SNORT	Stolen software Scams
SLO-9&10	Lab 2: Rail fence row and column transformation	Lab 5: Implement Brute force Attack	Lab 8: Implement SCAN methods	Lab 11: Intrusion Detection System to detect attacks	Lab 14: Real time network traffic analysis
SLO-11	Attacks and Countermeasures Malicious attacks	Network Scanning Types of network scanning	NULL SCAN IDLE SCAN	Firewalls Intrusion Prevention systems	Criminal Hackers Plagiarism
SLO-12	Types of malicious attacks Common attack vectors	Vulnerability Scanning Pros and Cons	FIN SCAN Comparision of scans	Firewall characteristics Types of firewalls	Phishing Cyber bullying
SLO-13	Web application attack Countermeasures	Types - Vulnerability Scanning OWASP Top 10 vulnerabilities	Banner Grabbing OS finger printing	Firewall Location Configurations	Cyber Safety Tips to stay protected
SLO-14&15	Lab 3: Implement Dictionary Attack	Lab 6: Program to hide text data in image file (Steganography)	Lab 9: Sniff ARP traffic	Lab 12: OS finger printing	Lab 15: Data packet logging

Resources			
1	Nina Godbole and SunitBelpure, “Cyber Security- Understanding CyberCrimes, Computer Forensics and Legal Perspectives”, Publication Wiley	4	David Sutton, “Cyber Security - A practitioner's guide”, BCS, The Chartered Institute for IT Publication, 2017, ISBN-13: 9781780173405
2	Computer Security Principles and Practice,William Stallings, Lawrie Brown, Third Edition, Pearson Education, 2015	5	Georgia Weidman, “Penetration Testing: A Hands-On Introduction to Hacking”, No Starch Press, 2014
3	Patrick Engebretson, “The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made easy”, Elsevier, 2011	6	Kimberly Graves, “CEH Official Certified Ethical hacker Review Guide”, Wiley Publishers, 2007

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers					
Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Mrs. J. Shyamala Devi, MCA,ME, Asst. Prof. – BCA

Course Code	UCA24D19J	Course Title	Big Data Analytics	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	2	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Understand the Big Data Platform and its Use cases	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entreprenuerial Risk Taking	PSO-1	PSO-2
CLR-2	Provide an overview of Apache Hadoop																	
CLR-3	Provide HDFS Concepts and Interfacing with HDFS																	
CLR-4	Understand Map Reduce Jobs																	
CLR-5	Provide hands on Hodoop Eco System																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	Identify Big Data and its Business Implications.	✓	✓	-	-	*2*	*85*	*75*	*3*	*-*	*-*	*1*	*-*	*3*	*-*	*2*	*2*	*1*
CLO-2	List the components of Hadoop and Hadoop Eco-System	✓	✓	✓	-	*2*	*85*	*75*	*3*	*2*	*1*	*2*	*2*	*3*	*-*	*1*	*2*	*1*
CLO-3	Access and Process Data on Distributed File System	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*1*	*3*	*1*	*3*	*3*	*-*	*1*	*1*	*2*
CLO-4	Understand the YARN Infrastructure	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	*3*	*3*	*3*	*-*	*2*	*3*	*3*
CLO-5	Manage Job Execution in Hadoop Environment	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	*3*	*3*	*3*	*-*	*3*	*3*	*3*

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Introduction of Big Data	**Hadoop - Overview**	**File System**	**MapReduce Applications**	**Pig Platform**
	15	**15**	**15**	**15**	**15**
SLO-1	Introduction of Big Data Big Data Tools Overview	Big Data Hadoop Overview of Hadoop	Big Data HDFS Overview of Eco System	How does MapReduce Work? Business benefits of MapReduce	Introduction to PIG Execution Modes of Pig,
SLO-2	Hadoop Apache Strom	Apache Hadoop overview Business Benefits of Apache Hadoop	HDFS YARN	Business Challenges of MapReduce MapReduce Architecture	Comparison of Pig with Databases Grunt
SLO-3	Hadoop Apache Strom	Need of Apache Hadoop Components of Hadoop	Map Reduce Spark	MapReduce Example Implementation of MapReduce	Pig Latin User Defined Function
SLO-4&5	Lab 1: Normalizing data	Lab 4: Creating Modules	Lab 7: Set up Hadoop cluster configuration	Lab 10: Import data from MS Excel into HDFS	Lab 13: Implement partitioner in Hadoop
SLO-6	Big Data Technologies Overview Data Management	Processing Layer (MapReduce) Storage Layer (HDFS)	Pig Hive	Job Scheduling Optimizations, MR Task Distribution Optimization Networking & I/O Optimizations	Data Processing Operators Hive Shell
SLO-7	Data Mining In-Memory Analytics	Hadoop YARN Apache Spark overview	HBase Mahout	Iterative Processing Join Operations	Hive Services Hive Meta store
SLO-8	Predictive Analytics Text Mining	Benefits of Apache Spark Need of Apache Spark	Zookepper Oozie	Data Access Load Balancing	Comparision with Traditional Database HiveQL
SLO-9&10	Lab 2: Formatting data	Lab 5: Install and configure Hadoop, set working directory and various processes	Lab 8: Implement HDFS and explore its characteristics	Lab 11: Import data from MySQL into HDFS	Lab 14: Implement nested MapReduce
SLO-11	Big Data Analytics Text Analytics	Components of Apache Spark Spark Core Engine	Basic File System Operations in File system	Data Flow Optimization Short Job Optimization	Tables Querying Data
SLO-12	Information extraction Text Summarization	Spark SQL Spark Streaming	Data Flow Data Ingest	Controlling Map Reduce Excecution Input Format	User Defined Function HBasic

SLO-13	Question Answering, Role of Bigdata Working with Semi-structured Data, UnStructured Data	MLib , GraphX, Hadoop 2.X versus Hadoop 3.X Processing data with Hadoop and Interacting with Hadoop Eco System	Flume and Scoop, Hadoop archives, Hadoop I/O: Compression Serialization, Avro and File-Based Data structures	Reader , Writer, Combiner, Partitioners Developing simple MapReduce Application.	Concepts in HBase, Hbase Versus RDBMS Hive Services, Data types in Hive, Built in function in Hive, Big SQL
SLO-14&15	Lab 3: Importing Modules	Lab 6: Implement basic commands in Hadoop to manipulate big data.	Lab 9: Explore the properties of YARN	Lab 12: Implement reducer in Hadoop	Lab 15: Create a scenario based on real time domain

Resources			
1	Tom White, “Hadoop: The Definitive Guide” Third Edition, O’reily Media, 2012.	2	SeemaAcharya, SubhashiniChellappan, “Big Data and Analytics”, Wiley Publications, 2nd Edition, 2014
3	Black Book Big Data, Dream tech publications, 1st Edition, 2017.	4	DT Editorial Services, Big Data Black Book, Dreamtech Press, First Edition, 2016.

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
Total (%)		100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

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Course Code	USA24D20J	Course Title	Blockchain Technology	Category	D	Discipline Core / Elective Course	L	T	P	C
							3	0	2	4

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10	
CLR-1	State core blockchain concepts, the benefits, and the limitations of blockchain technologies.	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2	
CLR-2	Acquire knowledge about cryptography and cryptocurrency fundamentals																		
CLR-3	Obtain knowledge on Consensus mechanism algorithm.																		
CLR-4	Acquire knowledge about open-source blockchain platform																		
CLR-5	Determine real world challenges that blockchain technologies may assist in solving																		
CLO	*At the end of this course, learners will be able to:*																		
CLO-1	Contentedly discuss and describe the history, types and applications of Blockchain	✓	✓	-	-	*2*	*85*	*75*	*3*	-	-	*1*	-	*3*	-	*2*	*2*	*1*	
CLO-2	Gains familiarity with cryptography and Consensus algorithms.	✓	✓	✓	-	*2*	*85*	*75*	*3*	*2*	*1*	*2*	*2*	*3*	-	*1*	*2*	*1*	
CLO-3	Apply the tools for understanding the background of crypto currencies	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*1*	*3*	*1*	*3*	*3*	-	*1*	*1*	*2*	
CLO-4	Identify in different open-source blockchain platform	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	*3*	*3*	*3*	-	*2*	*1*	*3*	
CLO-5	Identify major research challenges and technical gaps existing between theory and practice in cryptocurrency domain	✓	✓	✓	✓	*3*	*85*	*75*	*3*	*3*	*2*	*3*	*3*	*3*	-	*3*	*1*	*3*	

Sessions	CLO 1	CLO 2	CLO 3	CLO 4	CLO 5
	Introduction to Block chain	**Fundamentals of Cryptocurrency**	**Consensus Mechanism**	**Ethereum Network**	**Blockchain Attacks**
	15	**15**	**15**	**15**	**15**
SLO-1	Distributed DBMS Limitations of Distributed DBMS	Cryptocurrency Fundamentals Bitcoin	Operation of Bitcoin Blockchain Blockchain Architecture	Ethereum Ethereum Network	Blockchain Implementation Challenges Zero Knowledge proofs
SLO-2	Introduction to Block chain History, Definition	Digital Keys and Addresses Transactions, Mining	Block, Hash, Distributer P2P Structure of Blockchain	Ethereum Virtual Machine (EVM) Components of Ethereum	Protocols in Block chain Succinct non interactive argument for Knowledge (SNARK)
SLO-3	Physical Ledger vs Digital Ledger Distributed Ledger	Bitcoin Networks and PaymentsWallets Alternative Coins,	Database vs. Blockchain Architecture How does Blockchain Architecture works	Wallets for Ethereum Solidity	Pairing on Elliptic curves, Zcash
SLO-4&5	Lab 1: Create a Public Ledger vs. Private Ledger with the various attributes like Access, Network Actors, Native token, Security, Speed and examples.	Lab 4: Bitcoin Wallet Creation and Transactions	Lab 7: Building a Distributed Peer-to-Peer Network	Lab 10: Ethereum Network Setup	Lab 13: Understanding Zcash , a privacy-focused cryptocurrency
SLO-6	Digital Money to Distributed Ledgers, Design Primitives: Protocols, Security, Consensus	Name coin, Zcash Bitcoin limitations	Consensus mechanism Proof of Work (PoW)	Smart Contracts some attacks on smart contracts	Attacks on Blockchains Sybil attacks
SLO-7	Blockchain Categories: Public, Private	Cryptography Fundamentals overview of Hashing	Proof of Stake (PoS) Byzantine Fault Tolerance(BFT)	Ethereum and Smart Contracts The Turing Completeness of Smart Contract Languages	selfish mining 51% attacks
SLO-8	Consortium Blockchain Categories Use Cases	cryptographic algorithm SHA 256,signature schemes	Proof of Authority (PoA) Proof of Elapsed Time (PoET)	verification challenges comparing Bitcoin scripting vs. Ethereum Smart	Sharding based consensus algorithms
SLO-9&10	Lab 2: Peer-to-Peer Network Simulation	Lab 5: Bitcoin Mining Simulation	Lab 8: Consensus Mechanism Simulation	Lab 11: Solidity Smart Contract Development	Lab 14: Case Study about the different attacks
SLO-11	Blockchain Network and Nodes Peer-to-Peer Network	Encryption schemes and elliptic curve cryptography, Introduction to Hyperledger	Consensus protocols Permissioned Block chains	Contracts Decentralized Applications (DApps)	Introduction to Web3 Contract Deployment

SLO-12	Decentralized networks and technology (serverless) Features of Blockchain	Hyperledger framework Hyperledger as a Protocol	Design goals Consensus protocols for Permissioned Block chains.	Any two example Decentralized Applications (DApps)	POST Requests
SLO-13	Applications of Blockchain technology	Hyperledger Fabric Digital Security Technology	Block chain network creation	Blockchain oracles	Development Frameworks
SLO-14&15	Lab 3: Explore available tools for blockchain technology	Lab 6: Implementation of Cryptographic hash functions used in password verification.	Lab 9: Building Blockchain	Lab 12: Explore any one Decentralized Applications (DApps)	Lab 15: Simple application using web3

Resources			
1	Melanie Swan, “Block Chain: Blueprint for a New Economy”, O’Reilly, First Edition, 2015.	2	Daniel Drescher, “Block Chain Basics”, Apress; 1st edition, 2017.
3	Imran Bashir, “Mastering Blockchain: Distributed Ledger Technology, decentralization, and smart contracts explained”, 2nd Edition, Packt Publishing Ltd, March 2018.	4	Mark Gates, “Block chain: Ultimate guide to understanding block chain, bit coin, crypto currencies, smart contracts and the future of money”, Wise Fox Publishing and Mark Gates 2017.
5	Ritesh Modi, “Solidity Programming Essentials: A Beginner’s Guide to Build Smart Contracts for Ethereum and Block Chain”, Packt Publishing, 2018	6	Lorne Lantz, Daniel Cawrey, “Mastering Blockchain: Unlocking the Power of Cryptocurrencies, Smart Contracts, and Decentralized Applications, First Edition, 2020.

Assessment

Bloom`s Level of Thinking		Continuous Learning Assessment (CLA) (50% weightage)								Final Assessment (50 % weightage)	
		CLA – 1		CLA – 2		CLA – 3		CLA – 4*			
		(10 %)		(10 %)		(20 %)		(10 %)			
		Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)	Theory (%)	Practice (%)
1	Remember	20	20	20	20	15	15	20	20	20	20
2	Understand	20	20	20	20	15	15	20	20	20	20
3	Apply	20	20	20	20	20	20	20	20	20	20
4	Analyze	20	20	20	20	20	20	20	20	20	20
5	Evaluate	10	10	10	10	15	15	10	10	10	10
6	Create	10	10	10	10	15	15	10	10	10	10
	Total (%)	100	100	100	100	100	100	100	100	100	100

Strategies

Technology		Pedagogy / Andragogy		Sustainable Development	
Simulations		Clarification/Pauses	✓	Good Health & Well Being	✓
Presentation Tools	✓	Group Discussion	✓	Quality Education	✓
Learning Management System	✓	Hands-on Practice	✓	Gender Equality	✓
		Debate	✓		
		Interactive Lecture	✓		
		Brainstorming	✓		

***The evaluation can be done on the one or more parameters that include, (i) Seminars, (ii) Mini-Project, (iii) Case-Studies, (iv) MOOC Certification, (v) Publication of Article, (vi) Presentation of Research Work in Conferences**

Designers

Professional Experts		Higher Institution Experts		Internal Experts	
1	Mr.Jothi Periaswamy, Founder/Chief Data Scientist, DeepSphere AI, 2 Venture Drive, #13-26 Vision Exchange, Singapore, 608526	1	Dr.S.Gopinathan, Professor, University of Madras, Chennai	1	Dr.P.Chanthini, SRMIST, KTR Campus

Course Code	UCA24P04L	Course Title	Research Project and Dissertation	Category	P	Project Work / Internship	L	T	P	C
							0	0	24	12

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
CLR-1	To understand the basics of software development	1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-2	To know about life cycle of the software development	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical	Communication Skills,	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action,	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-3	To explore risk and people management for software development																	
CLR-4	To learn about different software tools for software development.																	
CLR-5	To know about different techniques related to software development.																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	To conceptualize a novel idea / technique into a product	✓	✓	-	-	*2*	*85*	*75*	*3*	*2*	*1*	*-*	*3*	*-*	*3*	*2*	*3*	*3*
CLO-2	To think in terms of multi-disciplinary environment	✓	✓	✓	-	*2*	*85*	*75*	*2*	*1*	*1*	*-*	*2*	*-*	*2*	*1*	*3*	*3*
CLO-3	To understand the management techniques of implementing a project	✓	✓	✓	✓	*3*	*85*	*75*	*2*	*3*	*3*	*-*	*2*	*3*	*3*	*1*	*3*	*3*
CLO-4	To experience on the challenges of teamwork	✓	✓	✓	✓	*3*	*85*	*75*	*2*	*3*	*2*	*3*	*2*	*-*	*3*	*2*	*3*	*3*
CLO-5	To prepare documentation for all aspects of design work and presentation in a professional manner	✓	✓	✓	✓	*3*	*85*	*75*	*1*	*2*	*2*	*3*	*3*	*-*	*2*	*2*	*3*	*3*

Students can choose problems of their own interest to develop software package using the programming languages/tools available. There will be two reviews conducted during the project period for all the students. At the end of the project, every student shall submit a structured project report and will take a Viva Voce examination.

Assessment Component	Expected outcome	Type	Evaluators	Criteria or basis	Marks
Review – 0 Internship	Internship letter Submission Proposed Project title to be described. Abstract of the project.	Internal	Supervisor / Guide & Project Coordinator	Feasibility Study of the project	5
Review – I Project Proposal	A short presentation about the Problem statement Literature Survey System architecture Design Specifications	Internal	Supervisor/Guide	Clarity of the idea, Preliminary work done	10
Review – II	Presentation on Techniques, Model/ Algorithm, Modules, coding Prototype of the project	Internal	Supervisor/Guide	Clarity of idea, Presentation	10
Review – III	Final presentation, Demonstration of Project.	Internal	Supervisor/Guide	Technical demonstration, Presentation	10
Report Submission	Submission of final project report	Internal	Supervisor/Guide/Project Coordinator	Regularity, Originality, Systematic progress	15
Project Report	Evaluation of Project Report	External	Examiner(s)/ Reviewer(s)	Presentation, Handling Q&A	30
Viva – Voce	Final Presentation				20

The assessment method for the project work consists of in-semester and end semester evaluations as detailed below:

Assessment							
Project Work	**Continuous Learning Assessment(CLA) (50% weightage)**					**Final Evaluation (50% weightage)**	
	Review-0	**Review-1**	**Review-2**	**Review-3**	**Report Submission**	**Project Report**	**Viva-Voce***
	5%	10%	10%	10%	15%	30 %	20 %

*Student has to be present for the viva voce for assessment. Otherwise it will be treated as non-appearance for the examination with final grade as ‘Ab’

Course Code	UCA24P05L	Course Title	Professional Internship	Category	P	Project Work / Internship	L	T	P	C
							0	0	24	12

Course Offering Department	Computer Applications	Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil	Data Book / Codes/Standards	Nil

CLR	*The purpose of learning this course is to:*	Depth				Attainment			Program Learning Outcomes										
		1	2	3	4	1	2	3	1	2	3	4	5	6	7	8	9	10
CLR-1	Demonstrate skills learnt in the real time environment.	Conceive	Design	Implement	Operate	Bloom's Level of Thinking	Expected Proficiency (%)	Expected Attainment (%)	Problem Solving, Critical Thinking,	Communication Skills, Collaborating	Independent Thinking, Analytical	Leadership Qualities,	Digital Technology Skills	Value Inculcation, Multicultural	Environmental Action, Community	Entrepreneurial Risk Taking	PSO-1	PSO-2
CLR-2	Explore the different industries that are using IT																	
CLR-3	Enhance the skills in the system aspects																	
CLR-4	Understanding the professional connections with the knowledge learnt																	
CLR-5	Applying the skills in problem solving																	
CLO	*At the end of this course, learners will be able to:*																	
CLO-1	To get an insight of an industry and organization/company	✓	✓	-	-	*2*	*85*	*75*	*3*	*2*	*1*	-	*3*	-	*3*	*2*	*3*	*3*
CLO-2	To gain valuable skills and knowledge	✓	✓	✓	-	*2*	*85*	*75*	*2*	*1*	*1*	-	*2*	-	*2*	*1*	*3*	*3*
CLO-3	To make professional connections and enhance networking	✓	✓	✓	✓	*3*	*85*	*75*	*2*	*3*	*3*	-	*2*	*3*	*3*	*1*	*3*	*3*
CLO-4	To get experience in a field to allow the student to make a career transition	✓	✓	✓	✓	*3*	*85*	*75*	*2*	*3*	*2*	*3*	*2*	-	*3*	*2*	*3*	*3*
CLO-5	To get an inside view of an industry and organization/company	✓	✓	✓	✓	*3*	*85*	*75*	*1*	*2*	*2*	*3*	*3*	-	*2*	*2*	*3*	*3*

Students can choose a company of their own interest for internship for a period of minimum four weeks to learn about the application of IT in real time environment. In the first week of July, all the students have to give a presentation about their observations made by them in internship. At the end of the internship period, every student shall submit a structured internship report within 15 days from the date of the completion of the internship period.

Assessment Component	Expected outcome	Type	Evaluators	Criteria or basis	Marks
Review-1	Internship letter Submission Internship title to be described.	Internal	Supervisor / Guide & Internship Coordinator	Feasibility Study of the Internship	20
Review-2	A short presentation about the internship work	Internal	Supervisor / Guide & Project Coordinator	Clarity of the idea, Preliminary work done.	30
Internship Report	Evaluation of internship Report	External	Examiner(s)/ Reviewer(s)	Presentation, Handling Q&A	30
Viva-Voce	Final Presentation				20

Assessment				
	Continuous Learning Assessment(CLA) (50% weightage)		**Final Evaluation (50% weightage)**	
	Review-1	**Review-2**	**Internship / Project Report**	**Viva-Voce***
Project Work / Internship	20%	30%	30 %	20 %

*Student has to be present for the viva voce for assessment. Otherwise it will be treated as non-appearance for the examination with final grade as 'Ab'.